The Nature of Personality Development across Middle Adulthood

Thesis

presented to the Faculty of Arts

of

the University of Zurich

for the Degree of Doctor of Philosophy

by

Regula Lehmann

of Langnau im E. (BE) and Zürich (ZH)

Accepted in the fall semester 2011 on the recommendation of

Prof. Dr. Mike Martin and Prof. Dr. Alexander Grob

2011

An oak may come from an acorn, but it is not identical with an acorn, nor even with the acorn plus all that the oak has absorbed of moisture and food in the process upwards. ... Being is becoming and fixity is an abstraction or an illusion.

Jacques Barzun (1958, pp. 51-52)

Acknowledgement

First of all, I would like to thank Mike Martin and Mathias Allemand for their mentoring and support during the past three years, and for introducing me so well to academic life. I always felt encouraged and supported.

My thanks also go to my colleagues at the Department of Psychology for motivating talks and fun coffee breaks.

I owe my deepest gratitude to my parents Christine & Hansruedi, and to my brother Matthias. They always supported me in my academic endeavors and had an open ear.

I am heartily thankful to Michael, who was supportively and patiently by my side during the whole process of my dissertation. He also helped me to experience relaxing and wonderful week-ends out in the wild.

Finally, I want to thank all my friends who were there for me during the whole time.

Contents

Tables

Figures

1. Introduction

The very idea of personality presupposes a set of enduring individual characteristics that are relatively stable and consistent across places, tasks, and people's interactions. The present thesis examines personality stability and change across middle adulthood, the period of life often considered the most stable. The thesis starts with the definition of central constructs in personality theory and personality development psychology. Furthermore, middle adulthood will be described as a context of personality development (*chapter 1*). Based on theoretical assumptions and findings of previous research, three open questions are identified (*chapter 2*). The first question addresses the amount and nature of mean-level personality changes across middle adulthood. The second research question asks if and to what extent middle-aged individuals differ from each other in personality trait development. The third question explores whether life events can predict interindividual differences in personality level and change in middle adulthood. These research questions are addressed in one review article and three empirical studies (*chapter 3-6*). While study 1 reviews theoretical concepts and empirical findings on personality development in adulthood, study 2 examines empirically the different types of personality stability and change in middle adulthood using longitudinal data. Based on the criticism by Denissen and Penke (2008a) the Big Five being too descriptive, study 3 focuses on age differences in a relatively new motivational conceptualization of the Big Five traits. Finally, study 4 investigates whether divorce can predict interindividual differences in personality trait development in middle adulthood. The last chapter (*chapter 7*) consists of a general discussion of the findings relating them to the three research questions. Furthermore, implications, consequences for future research, and methodological considerations are presented. Then, it follows an outlook on how to apply the relatively new idiographic filter approach developed by Nesselroade and colleagues on the field of personality development research. The thesis ends with a short conclusion.

1.1 Theoretical Assumptions about Personality

Personality psychology focuses on those most important differences in social and emotional functioning that distinguish one person from the other. Personality has been conceptualized from a variety of theoretical perspectives, and at various levels of abstraction (John, Hampson, & Goldberg 1991; McAdams, 1992). After decades of research, the field is approaching consensus that the Big Five personality trait taxonomy might represent the various systems of personality description in a common framework (John & Srivastava, 1999). The present thesis is based on research investigating the development of the Big Five traits. Accordingly, the following chapter gives a brief introduction into the Big Five trait taxonomy. In addition, personality research has pointed out the hierarchical nature of personality. Because the present thesis takes a developmental approach on personality, it is important to distinguish between different levels of analysis such as traits or item clusters. Therefore, the subsequent chapter describes personality in hierarchical terms.

1.1.1 The Big Five Trait Taxonomy

Sir Francis Galton may have been among the first scientists to recognize that the most important individual differences in social and emotional functioning can be encoded as single words in most of the world's languages. Starting from that lexical hypothesis Allport and Odbert (1936) conducted a lexical study of personality-relevant terms in an English dictionary and identified terms that distinguish the behavior of one individual from that of another. At the end, their list contained around 18,000 terms. In the following years, Cattell (1943) used this trait list as a starting point and drastically reduced the number of terms to a set of 35 highly complex bipolar variables. On the basis of these variables, many scientists tried to identify the major dimensions of personality description whereby five factors have proven to be replicable (e.g., Digman & Takemoto-Chock, 1981; Tupes & Christal, 1961). Today these five trait dimensions are known as the Big Five (e.g., Goldberg, 1990; John, 1992; John & Strivastava, 1999) or five-factor model (e.g., McCrae & John, 1992; McCrae & Costa, 1999). Referring to Costa and McCrae (1985, 1992), the five trait dimensions can be labeled neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. According to John and Strivastava (1999), neuroticism and its opposite emotional stability describe negative emotionality such as feeling anxious, nervous, sad, and tense. Extraversion implies an energetic approach toward the social and material world and includes traits such as sociability, activity, assertiveness, and positive emotionality. Openness to experience describes the breadth, depth, originality, and complexity of an individual's mental and experiential life. Agreeableness characterizes a prosocial and communal orientation towards

others and includes traits like altruism, tender-mindedness, trust, and modesty. Finally, conscientiousness describes socially prescribed impulse control that facilitates task and goal-directed behavior, such as thinking before acting, organizing, and following rules.

Although an impressive body of empirical work has demonstrated the usefulness of the Big Five personality traits or the five-factor model, the conceptualization of the five personality traits has also been criticized to be mainly descriptive (e.g., Block, 1995; Denissen & Penke, 2008a). According to Denissen and Penke (2008a), the Big Five traits need substantial theoretical elaboration and conceptual refinement. Therefore, thirteen years after Block (1995) stated his criticism, Denissen and Penke (2008a) tried to improve the conceptual underpinning of the Big Five traits by conceptualizing them as stable individual differences in people's motivational reactions to circumscribed classes of environmental stimuli. For example, neuroticism was conceptualized as individual differences in people's sensitivity to signs of social exclusion. Based on these considerations, the present thesis will examine personality development in the motivational conceptualization of the Big Five additionally to the traditional conceptualized Big Five traits.

1.1.2 Hierarchical Nature of Personality

An individual's behavior and experiences can be described at different levels of abstraction (McCrae & Costa, 2008). According to Roberts and Pomerantz (2004), the broadest level is represented by the personality traits found in standard omnibus personality inventories. As reported above they refer to enduring patterns of thoughts, feelings, and behaviors that are relatively consistent across a wide variety of situations and time. The midlevel of the continuum is characterized by a number of different constructs such as the lower-order facets of the Big Five (e.g. Costa & McCrae, 1995) or attachment patterns (Fraley, Waller, & Brennen, 2000). Finally, the simplest level of analysis is reflected by discrete behaviors, thoughts, and feelings. Focusing on personality development also reveals a clear hierarchy of changeability with higher order constructs being more stable than constructs on lower levels (Roberts & Pomeratz, 2004). For example, the trait neuroticism is more stable than anxious behavior in everyday life.

Because of the high abstraction of the Big Five traits, several researchers emphasize the importance of investigating the more specific levels in the Big Five hierarchy (Saucier, 1998; Terracciano, McCrae, Bran, & Costa, 2005). First, the NEO Personality Inventory Revised (NEO-PI-R; Costa & McCrae, 1992) is a personality measure that allows gaining information on both the Big Five traits and on more-finely grained facets whereby each of the Big Five consists of six facets. For example, the broad trait of neuroticism is composed of the

facets anxiety, angry hostility, depression, self-consciousness, impulsiveness, and vulnerability. Whilst the NEO-PI-R divides the Big Five into facets, it is not possible to calculate them in the NEO-Five Factor Inventory (NEO-FFI; Costa & McCrae, 1992), a brief and convenient version of the NEO-PI-R. However, Saucier (1998) demonstrated that most of the items of the NEO-FFI designated to measure the five personality traits fall into distinct, albeit related cluster subcomponents. Second, to analyze the lowest level of personality, an investigator might observe the actual behavior of participants in standardized laboratory activities or participants might be asked to report their current behavior in their everyday lives multiple times per day for a certain time span (Noftle & Flesson, 2010). Taking such an approach would show not only the typical way each person behaves but also his or her entire distribution of ways of behaving. To address the hierarchical nature of personality, the present thesis will investigate personality development both on the trait and on the lower-order cluster level.

1.2 Developmental Aspects of Personality

One of the most compelling issues about personality psychology is the question how personality develops across time. Is personality fixed at a certain age and are adults unable to change their personality? Or, can personality be expected to change across the whole lifespan? In the last decades researchers have characterized changeability of personality traits in varying degrees. For example, McCrae and Costa (1996) have argued that personality traits reach full maturity in early adulthood and predicted little or no change on any personality dimension in middle and older adulthood. By contrast, Lewis (1999) assumed little consistency of personality traits over time because environmental influences are the only meaningful determinant of our thoughts, feelings, and behavior. Rather than relying on past theoretical views on personality development, the present thesis aims to test empirically whether and how personality changes. In doing so, personality change and stability can be evaluated from multiple perspectives. Different types of personality development, either at the population- or individual-level, may be entirely independent of one another. Therefore, the first goal of this chapter is to describe key types of personality stability and change. The second goal is to focus on the mechanisms behind personality development.

1.2.1 Concepts of Stability and Change

Roberts, Wood, and Caspi (2008) defined five key types of personality stability and change that roughly fall into statistical and conceptual definitions. First, structural stability and change refers to the persistence of correlation patterns among a set of variables over time.

Second, differential stability and change refers to the degree to which the relative ordering of individuals on a given variable is maintained over time. Third, mean-level stability and change refers to change in the average level of a variable in a population or a sample. Fourth, ipsative stability and change is defined by the relative ordering of constructs within an individual over time and age. Fifth and finally, individual differences in stability and change capture each person's unique pattern of increasing, decreasing, or not changing at all on any given dimension. In the present thesis I will focus on mean-level stability and change and individual differences in stability and change. By these means both personality development on the population- respectively sample-level and on the individual-level can be captured.

Mean-level Stability and Change

Mean-level change tracks whether samples or populations as a whole increase, decrease, or remain the same on their average score over time and age (Roberts et al., 2008). Findings from cross-sectional and longitudinal studies suggest systematic age differences and age-related changes in the mean-levels of personality traits, especially in younger and older adulthood (e.g., Allemand, Zimprich, & Martin, 2008; Donnellan & Lucas, 2008; Roberts, Walton, & Viechtbauer, 2006; Srivastava, John, Goslin, & Potter, 2003; Terracciano, McCrae, Brant, & Costa, 2005). In general, individuals seem to increase in socially desirable personality traits such as agreeableness and conscientiousness, and tend to decrease in neuroticism across the lifespan. Openness to experience shows rather mixed results across studies and findings for extraversion are not characterized by a general pattern of change on the factor level (cf. Roberts et al., 2006). Although, these findings represent some common grounds, according to Srivastava et al. (2003) there is still considerable disagreement over the specific timing of personality changes within the lifespan. Therefore, the present thesis aims to examine accurately how mean-level personality development is characterized in middle adulthood.

Mean-level change is often equated with normative change in personality (Roberts et al., 2006). Normative change occurs when most individuals change in the same way during a specific period within the lifespan. Two opposing theories have been used to explain normative personality trait change. First, normative changes have been explained by invoking species-universal genetic influences and intrinsic maturation processes (e.g., McCrae et al., 2000). Second, normative change in personality traits is thought to arise due to engagement and investment in normative life tasks and social roles (Helson & Moane, 1987; Roberts et al., 2008). Mechanisms of personality development will be discussed in more detail later in this thesis (see *chapter 1.2.2*).

Individual Differences in Stability and Change

Although the discussed mean-level stability and change conceal important information on personality trait development, the fact that some individuals may be stable, and others change, is hidden by the aggregate nature of the accompanying statistical techniques for estimation (i.e., repeated-measures means) (Roberts, Robins, Trzesniewski, & Caspi, 2003). For example, if half of the individuals increase and half of the individuals decrease in a specific trait across time, mean-level analysis would reveal trait stability. Therefore, lifespan development researchers have supported the idea of individual differences in intraindividual change that refers to differences in type and magnitude of personality change that each individual experiences over time (Baltes, 1987; Nesselroade, 1991). This type complements the other concepts of stability and change by addressing unique patterns of development particular to individuals.

To date, relatively little research has taken such an approach. However, some investigators have demonstrated reliable individual-level change in adulthood (Bleidorn, Kandler, Riemann, Angleitner, & Spinath, 2009; Lüdtke, Trautwein, & Husemann, 2009; Mroczek & Spiro, 2003). These systematic deviations from the sample mean-levels suggest variability in the degree and direction of personality trait change (cf. Baltes, Reese, & Nesselroade, 1977). In this context, individual differences in development reflect the plurality and diversity in life experiences individuals can encounter throughout the lifespan. Specific life events thus might lead to different personality trait trajectories for individuals.

Although available research suggests individual differences in personality development, the amount of individual-level change in middle adulthood is still unclear. Moreover, only few studies have investigated the association of life events and individual differences in personality trait development. To fill that gap of research, the present thesis aims to examine individual-level change using several statistical methods. In addition, it will be tested if a specific life event can explain such individual differences in development in middle-aged adults.

1.2.2 Mechanisms of Personality Stability and Change

After establishing different types of personality stability and change, the following section will outline how personality change and stability might come about across the lifespan. Although I already touched the topic when defining the key types of personality development, mechanisms that are thought to be responsible for stability and change will be discussed in-depth in the sequel.

Why are Personality Traits Stable?

Genetic processes, environmental factors, person-environment transactions, and identity structure are assumed to enhance trait stability (Caspi & Roberts, 2001; Roberts et al., 2008). First, genetic factors could be contributors to stability in personality over time because the genome itself is unchanging. The five-factor theory of personality (McCrae & Costa, 2008) defines personality as genetically controlled basic tendencies implying that personality trait development should have their origins primarily in genetic processes. Furthermore, behavioral genetic studies revealed a strong genetic influence on the stability of most Big Five personality traits and facets (Bleidorn et al., 2009; Johnson, McGue, & Krueger, 2005).

Second, Caspi and Roberts (2001) claimed stability in personality traits because of the cumulative and continuing stability of the environments individuals inhabit. In addition, Roberts et al. (2008) proposed the role continuity principle which assumes that stable social roles like the role of the mother promote personality trait stability. According to Roberts et al. (2008) social roles capture the consistent subjective environment in the form of roles that people enact across time and place. Behavioral genetic studies that indicate a genetic influence on the stability of the Big Five traits, in general also promote environmental processes on personality stability. For example, Bleidorn et al. (2009) suggested an influence of both shared and non-shared environmental factors on 10-year personality stability in young and middle-aged adults.

Third, person-environment transactions capture an additional set of mechanisms that might promote stability in personality by combining environmental and individual difference factors (Caspi & Roberts, 2001). Roberts et al. (2008) proposed six different person-environment transactions contributing to stability, namely attraction selection, reactance, evocation, manipulation, and attrition. For example, attraction transactions reflect the processes by which people choose experiences whose qualities are consistent with their own personalities. Or, selection effects may enhance stability, whereby individuals are selected into situations and are given preferential treatment on the basis of their personality characteristics.

Fourth, with age, the process of developing, committing to, and maintaining an identity might lead to greater personality stability (Roberts et al., 2008). According to this so called identity development principle, individuals will select roles that appear to fit with their dispositions, values and abilities, and this selection process should facilitate stability over time (Roberts & DelVecchio, 2000). Findings from a longitudinal study on identity

development support the notion of a strengthening of the commitment process across time (Pulkkinen & Kokko, 2000).

Why do Personality Traits Change?

After the discussion of processes that might promote personality stability across time, it is of interest how personality trait change might come about. First, Caspi and Roberts (2001) proposed the notion that individuals respond to reinforcers and punishers which changes their behavior and in the long-term their personality. These environmental contingencies can be either explicit or implicit whereby explicit contingencies come in the form of concrete contingencies applied to a person's behavior. For example, parents reward and punish their children in the attempt to shape their behavior. In contrast, according to Caspi and Roberts (2001), implicit contingencies are subtler, and come in the form of unspoken expectations and demands often attached to new social roles. For example, being promoted to a leadership position will probably be associated with new expectations and demands such as taking on greater responsibility or acting as a model. These contingencies might change behavior and thus, in the long term, personality.

Second, watching ourselves and reflecting our own actions might support personality trait change (Caspi & Roberts, 2001). For example, many psychotherapeutic techniques aim to change patient symptoms in promoting insight into their maladaptive behavior (Smith & Grawe, 2005).

In addition, a third promoter of change in personality comes through watching others, such as parents, teachers, friends, and mentors (Caspi & Roberts, 2001). This approach is consistent with the social learning theory of Albert Bandura (1986) who proposed most human behavior is learned observationally through modeling. More specifically, Bandura (1986) suggested that by observing others, individuals form an idea of how new behaviors are performed, and on later occasions this coded information serves as a guide for action.

Fourth, Caspi and Roberts (2001) assumed as a potential source of change the feedback of individuals we are interacting with. For example, a husband may criticize the tardiness of his wife over and over again what might conclude in the wife's attempt to be more punctual.

Taken together, individuals might change in their personality by responding to contingencies, modeling others, and through receiving persistent feedback. Roberts et al. (2008) proposed that the most likely source of these forces of change arises through investing in social institutions, such as marriage, work, and community. These institutions, embodied in social roles bring with them expectations and demand for goal-directed and prosocial

behaviors, responsibility, and emotional stability. Based on this theory, Lodi-Smith and Roberts (2007) meta-analytically examined the cross-sectional patterns of relationships between social investment and the personality trait domains of agreeableness, conscientiousness, and emotional stability. Results revealed that the extent of investment in social roles was positively related to the personality traits and these findings were even more robust when individuals were psychologically committed to the investment role.

In the present thesis, the research on the mechanisms behind personality trait development will not focus on investment in social roles but instead aims to examine if a rather negative life event, specifically a divorce, might promote long-term personality change. However, it is assumed that also a negative life event is associated with implicit contingencies. For example, the new social role of the single parent might come with new expectations and demands such as an increase in parental responsibilities or a lack of social support. As in the above mentioned example of the job promotion, these expectations and demands might shape behavior and maybe in the long-term change personality.

1.3 Middle Adulthood as a Context for Personality Development

The following chapter provides an overview on the emergence of middle adulthood as a field of research. Furthermore, it is discussed how middle adulthood differs from earlier or later life periods. The chapter closes by an elaboration on how events and experiences taking place during this period might influence personality development in midlife.

1.3.1 The Emerging Field of Midlife Development

Historically, developmental psychologists have focused largely on childhood and adolescence. This trend has changed over the past 40 to 50 years as adult development has increasingly become a topic of research (Staudinger & Bluck, 2001). However, middle adulthood, roughly between ages 40 and 65, was still neglected because research focused primarily on old age. In 1992 (p. 171), Brim referred to the middle years as the "last uncharted territory in human development." The non-existence of exact age boundaries and of a clear definition of middle adulthood might be causes for the scarcity of research on midlife. In the last years, however, midlife seem to be identified as a period of the lifespan worthy of study in its own right. Two main reasons might explain this development in research. First, the baby boomer generation, those born between 1946 and 1964, reaching and passing through middle adulthood increased the impact and relevance of that life-stage. While in 1900 individuals in the middle years represented only 22.5% of the Swiss population, in 2009, the age group of the 40 to 64 year olds already represented 35.5% of the Swiss population

(Bundesamt für Statistik, 2011). Second, the growing interest in the period of middle adulthood might reflect the importance of development in middle adulthood for the aging process in later life. For example, Martin and Zimprich (2005) suggested with regard to cognitive aging that middle age might be an ideal time for preventive measures because the cognitive performance around a lifetime peak level increases the likelihood of training gains. Also, certain risky health behaviors such as an unhealthy diet or smoking during middle adulthood might show its cumulative consequences only in older age (Vita, Terry, Hubert, & Fries, 1998).

1.3.2 Salient Issues in Middle Adulthood

What is maybe most striking about middle adulthood is the wide variability in the nature and course of this life period (Lachman, 2004). A characterization of midlife is a challenging and complex endeavor because the experiences of middle-aged adults are so diverse and variable. However, there is more agreement concerning the sequence of development tasks that normatively occur in this period. According to Erikson (1950), one central developmental task in this life period is generativity, the concern for establishing and guiding the next generation. Furthermore, by midlife, individuals are expected to have established a family, found a clear career direction, and have taken on responsibility with respect to their children, their own aging parents, and sometimes their community (Staudinger & Bluck, 2001). These multiple social roles have to be coordinated and provide the individuals with the chance to customize their own experience (Moen & Wethington, 1999).

Family life is a context within which such social roles emerge (e.g., parent role, role of the spouse) and which is also central for the concept of generativity. Typically, family life in middle adulthood is characterized by children growing up and transition out of the active parenting role, with a rather broad age distribution in the latter (Perrig-Chiello & Höpflinger, 2001). Some theories proposed that the leaving of the last child from home and the cessation of the active parent role result in a state of depression and identity crisis (labeled as the empty-nest syndrome) especially for mothers (Borland, 1982). In contrast, current research suggests a rather small number of middle-aged parents experiencing the empty-nest syndrome (Mitchell & Lovegreen, 2009). Finally, DeVries, Kerrick, and Oetinger (2007) revealed that mothers tend to anticipate and plan for the transition out of the active parenting role while fathers tend to be less prepared for its emotional impact.

In the work domain, middle-aged adults often reach their peak in position and earnings (Lachman, 2004). In contrast, some individuals may experience age discrimination in job situations, because older workers are often considered to be less flexible, unwilling to learn or

change their ways (Sterns & Huyck, 2001). However, recent research on career stages suggests that age-related changes in motivational variables, rather than chronological age or cognitive abilities per se, play a key role in successful work outcomes for middle-aged workers (e.g., Kanfer & Ackerman, 2004; Simpson, Greller, & Stroh, 2002). Another phase in the work cycle that mostly occurs during later middle adulthood is the transition to retirement. Given the salience of paid work in midlife, exiting from one's career job is a key life change (Kim & Moen, 2001). Retirement tends to transform individuals roles, relationships, and daily routines, along with concomitant shifts in income, health, and sometimes even residence. Therefore, planning for retirement during middle adulthood tends to be especially important. For example, informal lifestyle planning seems to have an impact on favorable retirement expectations, retirement satisfaction, self-efficacy, and overall well-being after retirement (e.g., MacEwen, Barlin, Kellowy, & Higginbottom, 1995; Taylor-Carter, Cook, & Weinberg, 1997).

For many adults, midlife is also characterized by increasing health problems whereby large interindividual differences exist. For example, age-related changes in the arteries include an increasing risk of hypertension from middle adulthood and on (Whitbourne, 2001). Research also revealed an acute awareness of changes in physique, physical fitness, and energy level in both middle-aged women and men (Rossi, 2004). In addition to an increase in health problems, women in midlife also have to deal with the menopausal transition (Netz, Zach, Dennerstein, & Guthrie, 2005). However, recent studies have disclaimed the notion described by medical research, clinical practice, and pharmaceutical industry that menopause is an unhealthy stage in a woman's life (e.g., Rossi, 2004). Instead, menopause has been redefined as a natural life transition. For example, research does not demonstrate any pervasive trauma during this transition in women's live. Moreover, according to Rossi (2004), only a small minority of women report elevated symptoms typically associated with menopause.

To conclude, midlife seem to be characterized by both normative development tasks and interindividual differences. In the present thesis, instead of examining the association of normative life events with midlife personality development, I will focus on a rather non-normative life event, namely divorce. However, because the rate of divorce has been relatively high in the last decades, many middle-aged adults have to deal with strains and consequences associated with this difficult life event.

1.3.3 Personality Development in Middle Adulthood

As reported in the last section, middle adulthood is characterized by central development tasks associated with family life, work, retirement transition, and health. If challenges occur at the same time and to the same extent in the population of the middle aged adults, mean-level personality change could be expected. In contrast, McCrae et al. (2000) argued that personality traits reach maturity by age 30 and are largely stable till old age. However, meta-analytic findings suggest change and stability in personality across midlife (Roberts et al., 2006). More specifically, Roberts and colleagues (2006) reported a decline in neuroticism from age 50 till age 60, inconsistent results for extraversion, stability in openness to experience, an increase of agreeableness during the age period of 50 to 60, and finally, an increase of agreeableness from age 40 to age 50. In contrast, Lucas and Donnellan (in press) revealed in a longitudinal study a slight increase in neuroticism across midlife, a slight decrease in extraversion and openness to experience, whereas agreeableness and conscientiousness were relatively stable. To bring more clarity into mean-level personality development across the period of middle adulthood, the present thesis aims to describe in detail the patterning of mean-level stability and change. Specifically, the present thesis will investigate age differences and age-related changes in two large cross-sectional and longitudinal samples. Moreover, mean-level development will be examined using four different personality measures, whereby one measure is based on a relatively new motivational conceptualization of the Big Five traits.

Like reported in *chapter 1.2.1*, personality trait change is a multifaceted construct. In addition to mean-level development, change can also be tracked in individual differences in change (Mroczek & Spiro, 2003; Roberts et al., 2006). Some individuals may be stable on a given trait, but others may change to varying degrees. First, individual differences in the developmental trajectories of personality traits might be produced because some middle-aged adults experience non-normative life events such as the death of a child or a divorce. Non-normative life events indicate interindividual differences in development. Second, interindividual differences in development might occur because middle-aged adults typically differ in their timing of specific normative events and not all individuals experience every such event.

Previous research suggests individual-level change across adulthood (e.g., Löckenhoff et al., 2008; Mroczek & Spiro, 2003). For example, Löckenhoff et al. (2008) reported for a sample with a wide age span (aged 30 to 88) individual-level changes in all Big Five traits. While openness to experience with 12.6% showed the smallest proportion of changing individuals, 20.4% of individuals experienced reliable change in extraversion. However, still

little is known to what extent individual-level change occurs specifically in middle adulthood. Therefore, the present thesis aims to examine individual personality development across midlife on both the trait factor and item cluster level and by using two statistical methods. This approach will allow a more detailed picture of individual-level change in middle adulthood.

Beyond examining the nature and the amount of individual-level change, the present thesis further aims to investigate underlying mechanisms of personality trait development in midlife. This is important because there is a paucity of studies investigating why personality might change during that specific life period. There is especially a lack of research regarding the effect of non-normative life events on individual-level change, with a few exceptions (e.g., Costa, Herbst, McCrae, & Siegler, 2000; Mroczek & Spiro, 2003; Roberts & Bogg, 2004; Roberts, Helson, & Klohnen, 2002). For example, Costa et al. (2000) reported a very small influence of non-normative life events such as a dismissal on personality trait development in midlife. In addition, Roberts and Bogg (2004) revealed for women that divorce is associated with a decrease in social responsibility, a facet of conscientiousness. However, previous research shows several limitations. Some previous studies used a very small, highly educated, and women only sample (Roberts et al., 2002; Roberts & Bogg, 2004). Furthermore, some studies focused on only one or two of the Big Five traits (Mroczek & Spiro, 2003; Roberts & Bogg, 2004). Considering the shortcomings in previous research, the present thesis aims to test if a non-normative life event, namely divorce, can explain individual-level change on trait factor and item cluster level using a relatively large gender-mixed community sample.

2. Aims and Research Questions

The first and second research question aim to provide a better understanding of mean-level and individual-level personality stability and change across middle adulthood. The third research question goes a step further by seeking an understanding of mechanisms behind personality trait change. More specifically, the third question addresses if the life event divorce can predict interindividual differences in personality development. These three research questions were examined by combining different statistical approaches.

2.1 Research Question 1: What is the Amount and Nature of Age Differences and Age-Related Changes in Two Conceptualizations of the Big Five Personality Traits across Middle Adulthood?

Classical models of personality suggest that the adult personality is relatively stable and more or less fixed around the age of 30 years. In contrast, the lifespan development perspective based on the theoretical work of Paul Baltes and colleagues suggest that development is not completed at a specific age or life period. Thus, study 1 (*chapter 3*) aims to review theoretical and empirical work on personality development and aging from a lifespan development perspective. Next, the main objective of study 2 in *chapter 4* is to examine if and how mean-level personality changes occur after age 30, specifically in the period of middle adulthood. Using longitudinal data, mean-level development of personality traits will be examined over a 12-year period with three measurement occasions. In addition, study 2 will provide a theoretical rationale why personality development can be expected in middle adulthood. Finally, study 3 (*chapter 5*) has the objective to investigate age differences across midlife in traditional conceptualized Big Five traits and in a relatively new conceptualization of the Big Five, specifically in the motivational manifestations of the Big Five. To extend the analysis the present thesis aims to compare age patterns in motivational conceptualizations of the Big Five traits with Big Five traits that have a traditional descriptive background. Furthermore, study 3 will examine if mean-level development is primarily linear or quadratic.

2.2 Research Question 2: What is the Amount and Nature of Individual-Level Changes in the Big Five Personality Trait across Middle Adulthood?

Middle adulthood is characterized by a complex interplay of multiple roles and challenges such as balancing work and family responsibilities in the midst of the physical and psychological changes associated with aging. Furthermore, typical challenges do not appear at the same time and not for every middle-aged adult. Because this period of life is characterized by heterogeneity it can be speculated that there might be interindividual differences in personality development. To investigate the question about individual-level personality trait change, data were analyzed with two statistical approaches. First, study 2 in *chapter 4* will use the reliable change index which allows determining the number of individuals with a significant amount of change versus the number of individuals that essentially stayed the same. Second, in study 4 (*chapter 6*) interindividual differences in personality development were analyzed using multilevel regression models with full information maximum likelihood estimations. This statistical approach allows for including all participants, even those individuals with missing measurement occasions. Furthermore, using multilevel models allows to explicitly test for potential moderators of change.

2.3 Research Question 3: Can a Life Event Predict Interindividual Differences in Personality Level and Change in Middle Adulthood?

If individual differences in personality development exist, these differences in development might reflect the plurality and diversity in life experiences individuals can encounter throughout middle adulthood (Allemand, Gomez, & Jackson, 2010). Specific non-normative life events such as a divorce might explain interindividual differences in personality development. Divorce is a stressful life event, even when the marriage was unhappy and divorce was desired (Waite, Luo, & Lewin, 2009). In addition to the idea that a divorce represents a temporary crisis, researchers characterized divorce also as a source of chronic strain with long-term consequences (Amato, 2010; Johnson & Wu, 2002; Waite et al., 2009). This perspective points to chronic stressors like lack of social support, economic hardship, extra child care responsibilities, and stressors associated with custody arrangements often occur in the lives of divorced individuals. Because of these stressors, divorce might be associated with long-term personality trait changes across midlife. Therefore, study 4 (*chapter 6*) aims to examine if divorce predicts interindividual differences in personality trait development in middle adulthood. Data will be analyzed with multilevel regression models.

3. Study 1

3.1 Personality Development and Aging[1]

3.1.1 Introduction

How do our personalities develop across the adult lifespan into old age? And why do some people change whereas others remain stable? There have been a number of theories developed by prominent psychologists such as Freud and Erickson to answer these questions. Four, but not mutually exclusive theoretical perspectives on development might be helpful in thinking about personality development and aging. These are (1) the age-dependent perspective, (2) the life-event perspective, (3) the active-individual perspective, and (4) the lifespan development perspective. The first perspective relies upon the assumption that a person's personality may change or not as a function of biological aging (e.g., McCrae & Costa, 1999). The second perspective considers effects of normative life transitions and non-normative life events on personality development and may provide an understanding of how life circumstances can influence people's thoughts, feelings, and behaviors (Roberts, Wood, & Caspi, 2008). It assumes that the developing individual is responsive to certain kind of life circumstances and transitions (e.g., retirement) as well as to unexpected events (e.g., death of a child). The third perspective supposes that persons actively regulate their emotions, cognitions, and behaviors, and thus are active agents of their development (McAdams & Olson, 2010). In other words, what an individual brings to the context with his or her personality shape and change the context itself, which, in turn, may also influence the individual. Finally, the fourth perspective assumes that development is a lifelong process covering all periods of the lifespan (e.g., Baltes, 1987; Baltes, Lindenberger, & Staudinger, 2006; Caspi & Roberts, 1999, 2001). This perspective places emphasis on the potential plasticity of personality as a function of individual and contextual variables and compensatory behavioral changes to biological aging. The main argument is that complex dynamic interactions between individuals and their environment result in personality change (and stability) throughout the lifespan. This perspective provides a broad theoretical background for the present chapter.

The purpose of this chapter is to give an overview about theoretical and empirical work on personality development and aging from a lifespan development perspective. In the

[1] A similar version of this chapter is in press in "Encyclopedia of Human Behaviour" (Allemand & Lehmann, in press)

first part we introduce personality traits as units of analysis and use the well-known "Big Five" personality taxonomy to describe the trait domains that can be studied across the lifespan. In the second part we present the theoretical background of the lifespan development perspective in relation to personality traits. Finally, in the third part we give an overview of empirical research on personality trait development across the adult lifespan into old age by means of different types of change and stability.

3.1.2 Personality Traits as Units of Analysis

It is common in personality psychology to distinguish between structures and processes of personality (e.g., Hooker, 2002; Hooker & McAdams, 2003). Structures refer to the content and organization of personality, whereas processes reflect the dynamics of personality. Put it in other words, the two aspects refers to the "having" and "doing" sides of personality (Cantor, 1990). A structural approach to personality concerns how the parts of personality are organized together into distinct areas of personality, and what those areas of personality are. It focuses on how a person is different from other persons. For example, this approach examines how many factors best describe individual differences in thoughts, feelings, and behaviors. A process-related approach to personality concerns how the different parts of personality influence one another and affect individuals' behaviors and reactions to situations. This approach focuses on what goes on inside a person and thus aims to study the psychological functioning. For example, it examines how people regulate their emotions in daily life. Hooker and McAdams (2003) have proposed a personality model, called the six foci of personality, that integrates structures and processes within a levels-of-analysis framework and includes traits, personal action constructs such as goals, and life stories as structural components, and states, self-regulation, and self-narration as the parallel process constructs. Personality traits, the first level of the model, refer to enduring patterns of thoughts, feelings, and behaviors that are relatively consistent across a wide variety of situations and over time (Roberts, Walton, & Viechtbauer, 2006). They are organized in the conceptual framework of the "Big Five" (Goldberg, 1981) or Five-Factor model (McCrae & Costa, 1996), i.e., neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. Briefly, neuroticism, or conversely, emotional stability contrasts even-temperedness with the experience of anxiety, worry, anger, and depression (cf. John & Srivastava, 1999). Extraversion refers to individual differences in the propensity to be sociable, active, assertive, and to experience positive affect. Openness to experience refers to individual differences in the proneness to be original, complex, creative, and open to new ideas. Agreeableness refers to traits that reflect individual differences in the propensity to be

altruistic, trusting, modest, and warm. Finally, conscientiousness reflects the propensity to be self-controlled, task- and goal-directed, planful, and rule-following. The personality model contrast traits with states as dynamic processes of personality (e.g., moods, emotions) that are transient and involve short-term change (Hooker, 2002; Hooker & McAdams, 2003). Personal action constructs reflects motivational constructs such as strivings, goals, motives, and developmental tasks. They are contextualized in time, place, and social role, and are less broad than traits. The processes, when related to personal action constructs, can be called self-regulatory processes. Finally, according to Hooker and McAdams (2003), the life story is the individual's narrative understanding of the self. People create life stories that reconstruct the past and anticipate the future in order to provide their lives with some sense of meaning, unity, and purpose. Self-narration reflects parallel processes related to the life stories.

The personality model emphasizes differential changeability of personality and suggests that some constructs of personality are more responsive or sensitive to change than others (Hooker & McAdams, 2003). Specifically, regarding the development of structural components of personality, the model assumes that traits change the least and life stories the most, whereas mid-level personality features such as goals are more stable than the latter, but more responsive or sensitive to change than the former (cf. McAdams & Olson, 2010). Hence, the time that is needed to accurately capture systematic change in the respective constructs of personality is an important developmental aspect. Time intervals that are too short or too long in relation to the nature of the phenomenon being studied can produce data that in some case are overly sensitive to measurement errors and carry-over effects, in other cases, are insensitive to variability and change (Hertzog & Nesselroade, 2003). With respect to personality traits, the expected rate of change may, on average, be quite slow as compared to processes such as states or self-regulation.

In this chapter we focus on the development of personality traits rather than other important personality constructs such as goals, motives and life stories, or process constructs, given space constraints, and because most systematic work on personality development and aging refers to this level (for a detailed discussion of the development of other personality constructs, see McAdams & Olson, 2010; and Mroczek & Little, 2006).

3.1.3 A Lifespan Development Perspective

The lifespan development perspective "provides a way of thinking about development and aging" (Smith & Baltes, 1999, p. 48). This view that is based on the theoretical work of Paul Baltes and colleagues (1987, 2006) seeks to explain the general principles of development at all ages, and seeks to understand why some people exhibit different

trajectories of development in different domains of psychological functioning compared to others. Moreover, this view seeks to identify the extent to which these domains can be changed or enhanced at different points during the lifespan. The lifespan perspective recognizes that multiple dimensions of psychological functioning such as personality or cognition can change, that change is multidirectional and multiply caused, and that interdisciplinary approaches are the key for understanding change (Baltes, 1987; Baltes et al., 2006). Finally, this perspective recognizes that change occurs in social, cultural and historical contexts. We will briefly outline four basic concepts of the lifespan development perspective, which bear relevance for personality development and aging: (1) development as a lifelong process, (2) variability of development, (3) multidirectionality of development, (4) contextualism and development (for an extensive discussion of the lifespan development perspective, see Baltes et al., 2006). These concepts have important implications for personality development and aging as they may offer insights into the structures and processes of personality and thus have the potential to advance the understanding of personality development across the lifespan into old age.

Personality Development as a Lifelong Process

The key assumption of the lifespan development perspective is that development — be it in such diverse domains like cognition, emotion, motivation, or, in this case, personality — is not completed at a specific age or life period (e.g., young adulthood or midlife), but rather extends over the entire lifespan into old age (e.g., Baltes, 1987; Baltes et al., 2006). However, it is assumed that every age period in the lifespan (e.g., infancy, childhood, adolescence, adulthood, and old age) has its own developmental agenda and includes sensitive periods in which the developing individual is especially responsive to certain kind of developmental tasks or life experiences (e.g., Bornstein, 1989; Erikson, 1959). For example, adolescence is the period of psychological and social transition between childhood and adulthood that includes profound physical changes. Developmental tasks in this period might be that adolescents have to learn to establish intimate relationships and to have other exchanges that support a sense of self-identity and sensitivity for the needs of others (Hartup & Stevens, 1997). Another example refers to retirement as a period of different changes from the work life to retirement that comprises processes of adaptation to new situations (Kim & Moen, 2001).

Adopting this lifespan development concept for personality traits implies that personality development is a lifelong process (e.g., Caspi & Roberts, 2001). However, in personality research, the question of whether and how much personality changes in adulthood

was a controversial issue, resulting in two broad and opposite hypotheses regarding personality trait change (Roberts et al., 2006). On the one hand, the plaster hypothesis suggests that the adult personality is relatively stable. It assumes that personality is more or less fixed or crystallized at a certain point in young adulthood (e.g., around the age of 30 years) and that personality is thereafter relatively stable (see Costa & McCrae, 1994). It is argued that stability of personality traits is largely due to biological underpinnings such as genetic influences and environmental stability such as relative stable parental demands, teacher expectancies, and peer or partner influences (e.g., McCrae et al., 2000). Contrasting this view, the plasticity hypothesis asserts that personality traits remain changeable throughout the lifespan into old age (e.g., Baltes et al., 2006; Caspi & Roberts, 2001; Helson & Srivastava, 2001). Even though there is considerable stability in personality, personality traits are thought to have the capacity to change. Included in this hypothesis is the assumption that personality traits remain open systems that can be influenced by the environment at any age and thus remain susceptible to the pressures of life and the potential socialization effect of life experiences. This does not imply that the social and cultural contexts necessarily influence personality or that the traits must change, rather it assumes that they have the capacity to change at any age and eventually adapt to environments. The main argument is that complex interactions between an individual and its environment produce changes in personality across the lifespan (e.g., Baltes, 1987; Helson & Srivastava, 2001; Roberts, Robins, Caspi, & Trzewniewski, 2003). This idea is consistent with the concept of development as a lifelong process.

Multidirectionality of Personality Development

One central concept conveyed by contemporary work in lifespan development is that lifelong development involves diverse change patterns that differ, for example, in terms of timing (e.g., onset, duration, and termination), direction (e.g., increase, decrease, or stability over time), and order (e.g., change and then stability) (Baltes, 1987; Baltes et al., 1996). With respect to personality development this implies that developmental trajectories of personality traits can show age trends in every direction and also with different magnitude. In fact, as we will show below, previous research has clearly demonstrated that the Big Five personality traits are characterized by multidirectionality in their developmental course across the lifespan, while some traits increase with age, other remain relatively stable or decrease (e.g., Roberts et al., 2006; Srivastava, John, Gosling, & Potter, 2003). The concept of multidirectionality of development is strongly related to the concept of multidimensionality (Baltes, 1987; Baltes et al., 1996). This idea supposes that development may vary between

different domains of functioning (e.g., cognition, emotion, motivation, or personality) and also may vary within the respective domains. Pertaining to the "Big Five" as the conceptual framework for individual differences in personality traits this implies that each of the traits can develop differentially. As we outlined above, personality can be conceptualized as a multilevel and multifaceted construct that includes both structures and processes within different levels (McAdams & Adler, 2006). Taking this idea into account, different developmental trajectories with respect to different structural and process aspects of personality might emerge. Therefore, the concept of multidimensionality emphasizes the importance of comparing developmental trajectories across domains as well as within domains.

Variability of Personality Development

The lifespan development perspective assumes individual differences in development (Baltes, 1987; Nesselroade, 1991). That is, individuals might differ in their development at every level, not just between persons of different ages, or between different persons of the same age, but also within an individual over time. Individuals can differ markedly from each other in whether they are stable or changes in their psychological functioning such as cognition, emotion, or personality traits. This idea is embodied in the concept of interindividual differences in intraindividual change, which implies that some people change whereas others remain stable; and also people differ in degree and direction of change (Baltes, Reese, & Nesselroade, 1977). The term "interindividual differences" emphasizes the differences among individuals, whereas the term "intraindividual change" indicates variability within individuals. The lifespan perspective assumes that development across the lifespan is characterized by intraindividual variability (Baltes, 1987; Baltes et al., 1996). Variability is not a source of error variance, but rather it indicates the potentials for change that individuals have for different levels of psychological functioning. Depending on the life conditions and experiences of a given person, not everyone is characterized by the same developmental trajectories in personality traits. Hence, the capacity to adapt to a changing environment implies a bandwidth of intraindividual variability. To conclude, variability in development speaks to the unique patterns of development particular to individual lives.

Contextualism of Personality Development

Finally the lifespan development perspective assumes that development is embedded in historical and cultural contexts as well as in more proximal social contexts such as work and family contexts and thus is sensitive to contexts (Baltes, 1987). Put it in other words, the

contexts are the stages of life in which development of each individual takes place. That is, individuals are integrated in a changing world and in life environments that create opportunities for and limitations to individual developmental pathways. For example, contextual factors such as life circumstances and events in the life cycle — e.g., getting married, having children, getting divorce, the empty nest, the death of a spouse, the development of physical disability and cognitive problems in older age — may influence development. According to Baltes (1987), development is influenced by a dialectical interplay between three sources of contextual influences: (1) Age-graded or normative, (2) history-graded, and (3) non-normative influences. First, age-graded influences include biological (e.g., physical maturity, menopause) and environmental aspects (e.g., social clock, developmental tasks) that have a strong age correlation and shape development in relatively normative ways for all individuals. For example, as individuals move through their life, they are faced with quite similar challenges or developmental tasks and/or demands, such as becoming an adult, finding a place in society, establishing a family, starting a career, and/or be productive in other ways; and finally individuals have to deal with the end of their own life and those of loved ones. Second, history-graded influences denote biological and environmental factors that are associated with historical time and bring about the development of individuals different across cohorts and generations. Examples for this source of influence are wars, changes in technology, or changing social norms. Finally, according to Baltes et al. (1996), non-normative influences are idiosyncratic events that impact only some individuals and do not follow a predictable course. Some individuals experience specific positive life events such as getting an unexpected promotion, whereas others are subject to negative life events such as having a serious car accident or losing the job. Other people, in turn, report multiple life events, whereas others do not exhibit any major change in life circumstances.

With respect to the three sources of contextual influences it is important to consider that some life circumstances are age-graded and expectable, whereas others are unexpected or off-time (Baltes et al., 1996). It is assumed that the former might help to bring about change, particularly when clear information is provided about how to behave adaptively or how to change oneself (Caspi & Moffitt, 2003). The latter, on the contrary, may accentuate individual personality differences. Novel, ambiguous, and uncertain situations might violate expectations, undermine predictability, or generate discomfort and create a strong press to behave in certain ways. Because of the lack of information about how to behave adaptively, precisely at these times diverse ways in adapting to transitions might be observed. Regarding the developmental period of old age, many challenging developmental tasks in form of

changing life circumstances and negative life experiences (i.e., retirement, illness, widowhood) require adaptation that probably involves personality change (Baltes et al., 1996; Small, Hertzog, Hultsch, & Dixon, 2003). Particularly changes in health status, changes in social support, and a decrease in autonomy (i.e., the need to have a sense of choice and being the initiator of an action) have been shown to be associated with changes in personality traits (Maiden, Peterson, Caya, & Hayslip, 2003; Mroczek & Spiro, 2003).

Social Roles Includes Contextual Information

Although we assume that environments may have an influence on development, the issue of conceptualizing and measuring contextual aspects is rather complex. Roberts and Wood (2006) proposed a psychologically meaningful way to investigate contextual influences via the social role concept. They argued that rather than investigating the influence of objective contextual variables on personality development, it may be more meaningful to examine "subjective" environment in the form of social roles (e.g., worker role, parent role), and to investigate the relation between changes or stability in social roles and personality development. The idea is that roles contains cultural, societal, and individuals' expectations how to behave in social roles, and that an active, psychological commitment or investment to the roles might be associated with personality change. In line with this idea the work domain might reflect an important social context that might be related to personality change and vice versa (Roberts, Caspi, & Moffitt, 2003). In this context, the transition from work life into retirement is an example how change in the living context and in a social role (i.e., work role) can have an influence on personality development (Löckenhoff, Terracciano, & Costa, 2009). Löckenhoff et al. (2009) suggested that this environmental change, in general, decreases peoples pace and activity. Furthermore, people on average get less competitive and argumentative in the new social role of the pensioner. It could be assumed that after adapting to the role of the pensioner, a stable living context has a stabilizing influence on the individual's personality. Likewise, social relationships such as family or romantic relationships might be another path how social environments and changes in social contexts can influence personality and vice versa (Robins, Caspi, & Moffitt, 2002). One of the most consistent findings in the aging literature is a decrease in the number of social network partners as people age as well as a decrease of social roles in the late middle and older adulthood (Carstensen, 1992; Carstensen et al., 2011; Charles & Carstensen, 2010). Although older people may have smaller social networks than younger people, they are as satisfied with their relationships as younger persons, feel strong bonds to close friends, and frequently report greater emotional investment in their social relationships because often they have given up

their ties to more peripheral relationships. Regarding very old adults, however, more and more individuals of their close social network are passing away (Cohen-Mansfield, Shmotkin, & Goldberg, 2009). These relationships, in particular, seem to be very difficult to replace with similar close and intense contacts. Findings indicate that a decrease in social contacts and an increase in loneliness are associated with an increase in neuroticism in very old adults (Maiden et al., 2003).

To conclude, the concepts of the lifespan development perspective provides the theoretical background for thinking about personality development and aging. In the next section we give an overview of empirical research on personality trait development.

3.1.4 Different Types of Change and Stability

Based in particular on the outlined idea of development as a lifelong process we would expect that our personalities have the capacity to change across the lifespan into old age. Indeed, previous cross-sectional and longitudinal research has shown that both change and stability mark personality trait development across the lifespan, albeit differentially depending on the types of change and stability one considers (e.g., De Fruyt, Van Leeuwen, Bagby, Rolland, & Rouillon, 2006; Helson, Jones, & Kwan, 2002; Mroczek & Spiro, 2003; Roberts et al., 2006; Srivastava et al., 2003; Terracciano, McCrae, Brant, & Costa, 2005). In the following sections we clarify what we mean by change and stability and present empirical evidence for personality trait development organized according to different types of change and stability.

Change and stability are multidimensional constructs and each conceptualization offers unique perspectives to evaluate personality trait development, both conceptually and empirically (for details, see Roberts et al., 2008). Each type of change and stability offer a particular understanding to personality trait development. Consequently, to draw clear conclusions about personality trait development across the lifespan into old age, it is necessary to define what exactly is meant by the terms “change” and “stability.” To that end, we briefly outline three types of change and stability based on samples or populations of individuals and emphasizes the establishment of general developmental principles: (1) Structural stability, (2) differential stability, and (3) mean-level change. Finally, we describe two additional types of change and stability that are underrepresented in the literature on personality trait development: (4) Change in interindividual differences and (5) individual differences in change. The latter types of change addresses the patterns of individual development particular to individual lives and emphasizes the understanding of change and stability within an individual.

Structural Stability of Personality Traits

At the foundation of the different types of change and stability is structural stability, which refers to the stability in the interrelations among a set of variables across different age groups and over time (Roberts et al., 2008). With respect to personality trait development, this type of stability reflects stability in the structure of personality trait covariances. Consequently, a stable structure would imply that the positioning of traits relative to each other remains stable, suggesting that their meaning remains unaffected by age and aging. This type of stability can address the question of whether the covariation pattern among a set of variables is stable across age groups and time. Change in the structure of personality trait might be indicative of maturation of personality in young adulthood or might reflect aging processes in old adulthood. For example, studies have shown that the personality trait structure matures in adolescence and becomes more differentiated in late adolescence and young adulthood (e.g., Allik, Laidra, Realo, & Pullmann, 2004). Put differently, the results indicated that the correlations among the personality traits decrease during that age period. For example, if the negative correlation between extraversion and neuroticism decreases, this would imply that one could be extraverted without necessarily being emotionally stable. By contrast, a strong correlation would imply that being extraverted is closely connected to low neuroticism. Another theoretically plausible interpretation of structural change in personality might be borrowed from models of cognitive aging. It has been suggested that, as adults grow older, specialized cognitive abilities become less differentiated, that is, they become dedifferentiated and more highly correlated, respectively (e.g., Baltes, Cornelius, Spiro, Nesselroade, & Willis, 1980; Cattell, 1987). This dedifferentiation is thought to result from a decrease in integrity of the physiological systems related to the cognitive abilities, which reduces the specificity of particular skills. Another possible suggestion is that aging effects reflect decline in process-specific functions such as different abilities (e.g., Park et al., 2002; Zelinski, Gilewski, & Schaie, 1993).

Regarding personality traits, cross-sectional and longitudinal research has demonstrated relative high levels of structural stability in traits over time and across age groups in adulthood (e.g., Allemand, Zimprich, & Hertzog, 2007; Small et al., 2003). However, it is not clear whether the factor structure remains stable in old age. There is preliminary evidence for structural change in the Big Five traits in old age, suggesting that personality might become less differentiated or, in turn, more dedifferentiated over time in old age (Allemand, Zimprich, & Martin, 2008). Investigations of structural stability (but also other types of stability and change) often include the testing of measurement invariance or

equivalence (cf. Bollen, 1989; Meredith & Horn, 2001). This psychometric issue touches the question of whether psychological constructs are comparable across different age groups and/or across measurement occasions for the same individuals. Frequently, in lifespan developmental studies it is implicitly assumed that the measurement process of constructs is similar across age or time (Allemand, Zimprich, & Hendriks, 2008). However, there may be age differences or age-related changes in the conceptual frame of reference in interpreting or reacting to a given item of a questionnaire or stimulus materials in experimental studies, thus altering the way the latent construct underlying the item or stimulus is measured (Meredith & Horn, 2001). Therefore, it is important to systematically establish that the same attribute (e.g., neuroticism) is being measured in the same way across different groups (e.g., age groups) or on different measurement occasions. Measurement invariance or equivalence is considered a prerequisite for making meaningful inferences about change and stability of personality traits (see Hofer & Sliwinski, 2001).

Differential Stability of Personality Traits

This type of stability, also called rank-order stability, refers to the degree to which the relative ordering of individuals on a given variable is maintained over time (Roberts et al., 2008). It explicitly requires longitudinal research and is typically assessed through test-retest correlations or stability coefficients of measurement occasions separated by a specified time interval. This type of stability can address the question of whether people retain their standing on a trait dimension relative to others over time. A high test-retest correlation would implicate either that individuals are stable in a given trait over time or are changing, but in more or less the same way. This situation can occur when a normative developmental event such as retirement impacts all individuals in the same way (e.g., if retirement causes everyone to decrease or increase in a personality trait by the same amount). By contrast, a low test-retest correlation indicates that individuals are changing over time and there are individual differences in the direction of change, implying that some individuals are increasing in a personality trait whereas others are decreasing. This can occur when non-normative events impact personality traits (e.g., if some individuals get divorced and decline or incline in a particular personality trait whereas others do not experience this life event and maintain the same personality trait level). In addition, a low test-retest correlation can also occur when the factors that influence the personality trait are normative but individuals have unique reactions to these events (e.g., if retirement causes some individuals to increase in a personality trait but causes others to decrease in the same trait). Finally, from a methodological point of view, a

low test-retest correlation could also simply reflect measurement error or less reliable measurements (e.g., Murphy & Davidshofer, 2001; Watson, 2004).

Longitudinal studies have been conducted to investigate differential stability of the Big Five personality traits. In order to test whether trait stability maximizes and stabilizes at a specific period in the lifespan, Roberts and DelVecchio (2000) conducted an extensive meta-analysis and included 152 longitudinal studies. Estimates of mean population test-retest correlation coefficients showed that the overall trait stability increased from .31 in childhood to .54 during the college years, to .64 at age 30, and then reached a plateau around .74 between ages 50 and 70. Their findings suggest that there is a tendency for increasing relative stability of personality traits from childhood to old adulthood, a pattern that has been termed the "cumulative stability principle" (Roberts et al., 2008). Moreover, according to Roberts and DelVecchio (2000), differential stability did not vary markedly across the Big Five traits, nor across assessment method (e.g., self-reports, observer-ratings, and projective tests), or by gender. A slightly different pattern of trait stability is found for very old adults (i.e., 80-100 years). Results from previous research indicate a decrease in differential stability in extraversion in very old age (Martin, Long, & Poon, 2002). Hence, personality seems to become more plastic and prone to change again in very old age. To conclude, although a relatively high differential stability coefficient around .70 is found in late middle and older adulthood, it is not perfect (1.0) and leaves room for individual change. As mentioned above, individual change can be due to unexpected life events or off-time lifespan transitions (Caspi & Moffitt, 1993). The decrease in trait stability in very old adults might point to an increase in vulnerability as social and psychological resources diminish with age (Martin, Poon, Kim, & Johnson, 1996).

Mean-Level Change of Personality Traits

This type of change, also called absolute change, refers to the extent to which the average level of a variable changes systematically across different age groups and over time (Roberts et al., 2008). With respect to personality trait development, it reflects (a) cross-sectional age differences and (b) longitudinal age-related change in the average levels of personality traits. This type can address the question of whether average scores of individuals show systematic age differences or age-related change over time. Mean-level change is often equated with "normative change" in personality (Roberts et al., 2006). Normative change occurs when most people change in the same way during a specific period within the lifespan (e.g., adolescence). Change in the mean-levels might be thought to result from maturational and/or contextual processes (e.g., cultural and historical influences) shared by a population.

These shared processes could be biological in origin, such as the general period when adolescence begins or when menopause occurs in women. The timing of these biological phenomena is partially driven by genetic factors and tends to happen within a specific period of the lifespan for most people in the particular population of interest. Likewise, it is also possible that normative change in personality traits arises due to similar life tasks and an engagement and investment in age-graded life tasks and social roles (see above; Lodi-Smith, & Roberts, 2006).

Previous research on mean-level change in personality traits found a mixture of different patterns of how people change with age. Roberts et al. (2006) conducted an extensive meta-analysis and included 92 samples from longitudinal studies. Their results indicated that on average individuals became more socially dominant (a facet of extraversion), especially in young adulthood. They became more conscientious and emotionally stable and less neurotic, respectively, through midlife. Although much of the change on agreeableness was positive, the findings indicated that the increase was only statistically significant in the age 50 to 60 period. Other studies reported a positive association between agreeableness and age also in younger adulthood (Lucas & Donnellan, 2009; Srivastava et al., 2003). Finally, according to Roberts et al. (2006), people demonstrated gains in social vitality (another facet of extraversion), and openness to experience in adolescence and the equivalent decreases in old age for both of these trait domains. It seems that, on average, as people age they appear to get better at dealing with the ups and downs of life. In particular they tend to become more responsive, more caring, and more pleasant in social interactions (Roberts et al., 2008), and also more forgiving (Allemand, 2008). Many of these longitudinal personality trait development patterns are similar to those found in cross-sectional studies despite the potential cohort confound (e.g., Soto, John, Gosling, & Potter, 2011; Srivastava et al., 2003). Mixed results are found regarding mean-level changes in very old adults. While some studies revealed increases in neuroticism or agreeableness, other investigations found decreases in extraversion (Roepke, McAdams, Lindamer, Patterson, & Jeste, 2001; Small et al., 2003; Weiss et al., 2005). An increase in agreeableness in very old age might reflect differential survival, because low levels of agreeableness are related to coronary heart diseases (Dembroski, MacDougall, Costa, & Grandits, 1989), whereas a decrease in extraversion might reflect an adaptation to lower general energy level in old age (Carstensen & Charles, 1999). Finally, an increase in neuroticism in old age could reflect a more subtle and continuous adjustment associated with reduced personal control and adaptation to major

chronic illness, such as osteoarthritis (Small et al., 2003). Further research on mean-level changes in very old adults is needed.

Change in Interindividual Differences in Personality Traits

Irrespective of the level of differential stability and mean-level change in personality traits across age and time, the amount of interindividual differences (divergence) in personality traits might increase, decrease, or remain stable across age groups or over time (Biesanz, West, & Kwok, 2003; Martin & Zimprich, 2005). Empirically, this type of change can be examined by comparing personality trait factor variances cross-sectionally and, preferably, longitudinally (Allemand, Zimprich, & Martin, 2008). An increase or decrease of personality trait variances would indicate—even under conditions of perfect differential stability and no mean-level change—that the amount of change is different for different persons. Thus, the examination of age differences and age-related changes in variances in personality traits across the lifespan into old age is of particular importance to our understanding of the self. Simply focusing on the age variable neglects the fact that aging is differential, i.e., people show different age trajectories. Regarding a broad array of person variables it is assumed that variability increases with age. Indeed, with respect to cognitive functions and processes, there is empirical evidence for increasing variability with age regarding variables such as reaction time, memory, or fluid intelligence (cf. Morse, 1993; Nelson & Dannefer, 1992). This phenomenon is called "aged heterogeneity" (Dannefer, 1988).

Pertaining to personality development, there are numerous reasons why increasing differences among individuals might arise. For example, homogeneous developmental trajectories might reflect a more biologically driven developmental process, whereas increasing variances might denote changes triggered by external influences that are socially driven (Horn, 1988). Hence, the amount of interindividual differences should be relatively stable if personality traits are more genetically based (Johnson, McGue, & Krueger, 2005). By contrast, increasing differences among individuals might arise as a consequence of the combined effects of individuals' unique experiences over more years that would produce increasing differences among them (Allemand, Zimprich, & Martin, 2008). The genetic influence or the timing of genetic activity on interindividual differences vary widely according to age and thus cause individuals to diverge. Also, older people, somewhat freer from societal constraints, would be more likely to choose their own courses of action. In addition, significant changes in physiological and functional status in later adulthood may also produce change of divergence with age. Although this type of change and stability offers

additional information about personality trait development, very few studies focused on this type and the results were mixed (Allemand et al., 2007; Allemand, Zimprich, & Hendriks, 2008; Small et al., 2003). Regarding long-term change in old age, Allemand, Zimprich, and Martin (2008) reported preliminary evidence for increases in interindividual differences in some personality traits such as openness to experience, suggesting that older participants became more heterogeneous with respect to being open. Increased heterogeneity might result from events or life circumstances that impact only some individuals. Not every older adult is hit by cognitive or physical problems that constrain his or her daily life.

Interindividual Differences in Personality Trait Change

Although the four discussed types of change and stability, particularly differential stability and mean-level change, conceal important information on individual differences in personality traits, the fact that some individuals may be stable, and others changing, is hidden by the aggregate nature of the accompanying statistical techniques for estimation, i.e., correlations and repeated-measures means (Roberts et al., 2003). If individuals change differentially, this does not necessarily lead to mean changes, but it must lead to either change in the rank-order of individuals and/or change in variance. Lifespan development researchers have advocated the idea of individual differences in intraindividual change, which implies that some people change whereas others remain stable; and also people differ in degree and direction of change (Baltes, 1987; Baltes et al., 2006; Nesselroade, 1991). These are changes that deviate from the population mean-level patterns of change. This type complements the other types of change and stability by addressing unique patterns of development particular to individuals. Specifically, it emphasizes change and stability within the individual and implies that individuals change differentially, that is, the degree and direction or pattern of change (e.g., linear, quadratic) may vary across people. Although the investigation of individual differences in personality trait development may offer an understanding of each individual's unique pattern of development, the phenomenon of individual differences in change of personality variables has until recently been largely overlooked (Mroczek & Spiro, 2003). One reason for this is that for many years there was a lack of well-understood statistical models to estimate change accurately (Nesselroade, 1991; Spiro, Aldwin, Levenson, & Bossé, 1990). However, a variety of methods are now available that allow to model change over time, particularly the assessment and prediction of intraindividual change. With respect to personality trait development, there is now growing evidence for the existence of systematic interindividual differences personality trait change in young adulthood (e.g., Robins, Fraley, Roberts, & Trzesniewski, 2001), middle age (e.g., Allemand et al., 2007; Roberts, Helson, &

Klohnen, 2002), and old adulthood (Mroczek & Spiro, 2003; Small et al., 2003). There is preliminary evidence showing that individual differences in rate of change seem to be more influenced by non-normative events than by normative events.

Taking a perspective of interindividual differences in individual change may result in an important developmental question whether changes in different personality traits are related over time across individuals, and if so, to what degree. Whereas differential stability addresses the rank-order of change in a single personality factor, the aspect of correlated change covers the amount of correspondence in rank-orders of change across several personality factors such as the Big Five personality traits (Allemand et al., 2007; Martin & Zimprich, 2005). Investigating correlated change can address the question of whether there is an overall commonality in change in personality traits. Empirically, correlated change may be addressed by correlating intraindividual longitudinal change scores in different personality factors (Hertzog & Nesselroade, 2003; McArdle & Nesselroade, 1994). The issue of correlated change is underrepresented in the personality development literature, whereas it is more prominent in other fields of research, particularly in research on cognitive aging. It is an open question, however, whether changes in the Big Five personality traits are related or not across individuals. It might be that the same underlying causes of change such as social roles, life events, and social environments (for a comprehensive review of potential mechanisms of change and stability, see Caspi & Roberts, 2001; Roberts et al., 2008) operate simultaneously on multiple personality constructs such as the Big Five personality traits.

To conclude, previous findings on personality trait development across the adult lifespan into old age imply that although there is evidence for average personality trait changes, there are reliable differences in change between individuals.

3.1.5 Summary

Personality development is an important issue in personality and developmental science. Four take home messages stand out. First, personality is a multidimensional construct with different units of analysis (Hooker & McAdams, 2003). In the present chapter we focused on personality traits as structural components of personality. However, personality traits represent only one part of the big picture of individual differences. Therefore, it is important for future research to concurrently consider the multidimensional nature of personality. The levels-of-analysis framework could be a point of departure for such research efforts, because it integrates both structural and process units of analysis, and it also emphasizes that some units of personality are more responsive or sensitive to change than others. Second, the lifespan development perspective provides a helpful theoretical

background for thinking about personality development and aging (Baltes et al., 1996). Moreover, such a perspective offers broad theoretical explanations for personality development. In this chapter we emphasized four important concepts with respect to personality trait development. The key hypothesis is that personality trait development is a lifelong process, and that complex dynamic interactions between biological underpinnings and social, cultural, and historical contexts account for change and stability. Third, change and stability are multidimensional constructs (Roberts et al., 2008). Therefore, a complete understanding of personality development requires attention to several conceptually and statistically distinct types of change and stability. In this chapter we summarized empirical research on trait development based on five types. Fourth, there is now considerable empirical evidence for both change and stability of personality traits across the lifespan into old age (Roberts et al., 2008). At the same time, research has clearly demonstrated individual differences in personality development. To conclude, recent theoretical advances and empirical findings suggest that the future is bright for the scientific study of personality development and aging.

4. Study 2

4.1 Persönlichkeitsentwicklung im mittleren Erwachsenenalter[2]

4.1.1 Einleitung

Im Laufe der letzten Jahre hat das Fünf-Faktoren-Modell der Persönlichkeit (Neurotizismus, Extraversion, Offenheit für Erfahrungen, Verträglichkeit und Gewissenhaftigkeit) eine breite Akzeptanz erreicht (McCrae & Costa, 2008). Über die Veränderbarkeit dieser fünf Persönlichkeitsdimensionen im mittleren Erwachsenenalter existieren jedoch unterschiedliche Auffassungen. Zum einen betonen klassische Modelle der Persönlichkeitspsychologie die Stabilität der Persönlichkeit. Es wird beispielsweise davon ausgegangen, dass die Entwicklung von Persönlichkeitseigenschaften von der Kindheit bis ins frühe Erwachsenenalter stattfindet und im mittleren Erwachsenenalter durch Stabilität gekennzeichnet ist (z.B. Block, 1993; Costa & McCrae, 1994). Zum anderen geht die Entwicklungspsychologie der Lebensspanne davon aus, dass Veränderungen nicht an bestimmte Lebensphasen wie die Kindheit oder das höhere Alter gebunden, sondern über die ganze Lebensspanne möglich sind (Baltes, Lindenberger & Staudinger, 2006).

Mechanismen zur Erklärung von Stabilität und Veränderung von Persönlichkeitseigenschaften

Zur theoretischen Begründung von Stabilität der Persönlichkeit über die Lebensspanne sind verschiedene Erklärungskonzepte vorgeschlagen worden (vgl. Caspi & Roberts, 2001; Roberts, Wood & Caspi, 2008). Zum einen vertreten McCrae et al. (2000) die Meinung, dass Persönlichkeit angeboren ist und Stabilität von Eigenschaften im Erwachsenenalter insbesondere genetischen Einflüssen zuzuschreiben ist (Bouchard & Loehlin, 2001). Andere Autoren diskutieren die Rolle des Kontextes sowie Wechselwirkungen zwischen der Person und ihrer Umwelt als stabilisierende Mechanismen (z.B. M. Martin & Zimprich, 2005; Roberts et al., 2008). Beispielsweise suchen Menschen danach aufgrund ihrer Verhaltens- und Erlebensweisen bestimmte Kontexte auf, die ihnen grundsätzlich entsprechen und keine Veränderung erfordern.

Zur Erklärung der potentiellen Veränderbarkeit der Persönlichkeit kann angenommen werden, dass Persönlichkeitsveränderung als eine Funktion der Auseinandersetzung mit

[2] A similar version of this chapter has been published in „Zeitschrift für Entwicklungspsychologie und Pädagogische Psychologie“ (Lehmann, Allemand, Zimprich, & Martin, 2010)

kontextuellen Variablen und adaptiver Verhaltensänderungen angesehen werden kann (Baltes et al., 2006; Caspi & Roberts, 2001). Durch die Auseinandersetzung einer Person mit komplexen, wechselnden Umwelten und Entwicklungskontexten, sollte sich demnach Persönlichkeit verändern können (z.B. Baltes et al., 2006; Helson, Jones & Kwan, 2002; Neyer & Lehnart, 2007). So können neue Lebenskontexte sowie neue soziale Rollen Erwartungen und Anforderungen mit sich bringen, welche eine Anpassung bzw. Veränderung der grundlegenden Verhaltens- und Erlebensweisen erforderlich machen (Roberts et al., 2008). Auch die Beobachtung von Verhaltenstendenzen bei anderen Menschen kann im Sinne eines Modelllernens Veränderung bewirken. Zudem können Selbstreflexion und kritische Selbstbetrachtung zu Veränderungswünschen führen und in der Folge Veränderungen im Erleben und Verhalten erzeugen.

Stabilität und Veränderung von Persönlichkeitseigenschaften

Persönlichkeitseigenschaften können gleichzeitig stabil und veränderbar sein. Dies kann sich beispielsweise durch eine hohe Stabilität eines Merkmals auf der Gruppenebene und gleichzeitig bedeutsamer Veränderung auf der individuellen Ebene zeigen. Zur differenzierten Beschreibung der Veränderbarkeit von Eigenschaften im mittleren Erwachsenenalter werden deshalb in der vorliegenden Studie (1) die differentielle Stabilität, (2) die durchschnittliche bzw. Mittelwertsveränderung und (3) die individuelle Veränderung untersucht. Die drei untersuchten Typen von Stabilität und Veränderung fokussieren jeweils auf andere Aspekte der Persönlichkeitsentwicklung und sind statistisch und konzeptuell unabhängig voneinander (Roberts & DelVecchio, 2000).

Differentielle Stabilität wird als Konsistenz individueller Unterschiede innerhalb einer Gruppe von Individuen über die Zeit definiert. Perfekte differentielle Stabilität würde bedeuten, dass sich alle Personen im Laufe ihres Lebens in gleichartiger Weise verändern oder stabil bleiben, so dass keine Rangverschiebungen in der Population auftreten. Wird die differentielle Stabilität berechnet, zeigen sich unabhängig von der Persönlichkeitsdimension mittlere bis hohe Test-Retest-Korrelationen (Roberts & DelVecchio, 2000). Darüber hinaus nimmt die differentielle Stabilität mit zunehmendem Zeitintervall zwischen zwei Messzeitpunkten ab. Die Ergebnisse weisen aber auch darauf hin, dass die differentielle Stabilität mit zunehmendem Alter der Personen systematisch ansteigt.

Eine Mittelwertsveränderung bezieht sich auf die Zu- oder Abnahme im Durchschnittswert einer Persönlichkeitsdimension innerhalb einer Population über die Zeit. Befunde aus querschnittlichen und längsschnittlichen Studien weisen auf Mittelwertsveränderungen der Persönlichkeitsdimensionen, insbesondere im jungen und im

höheren Erwachsenenalter, hin (z.B. Allemand, Zimprich & M. Martin, 2008; Lüdtke, Trautwein & Husemann, 2009; Robins, Fraley, Roberts & Trzesniewski, 2001; Small, Hertzog, Hultsch & Dixon, 2003). Roberts, Walton und Viechtbauer (2006) haben in einer Metaanalyse die Befunde längsschnittlicher Studien zur Persönlichkeitsentwicklung zusammengefasst. Insgesamt sprechen die Ergebnisse für eine Zunahme von Verträglichkeit und Gewissenhaftigkeit sowie für eine Abnahme von Neurotizismus im Erwachsenenalter. Im Gegensatz dazu weisen Extraversion und Offenheit für neue Erfahrungen keine klaren Verläufe auf oder es findet sich ein leichter Abwärtstrend.

Die Gleichzeitigkeit und Gleichartigkeit von Entwicklungseinflüssen, wie sie beim Konzept der Mittelwertsveränderung angenommen wird, kann im mittleren Erwachsenenalter nur für wenige Ereignisse und Prozesse als wahrscheinlich erachtet werden, da im Allgemeinen eine Differenzierung von sozialen Rollen, Aufgaben und Ressourcen stattfindet (Feldman, 2009; Moen & Wethington, 1999). Auf Grund der Ungleichzeitigkeit des Auftretens und der Unterschiedlichkeit der Ereignisse muss von differentiellen Veränderungen ausgegangen werden. Um individuelle Veränderungsmuster abbilden zu können, wird in der vorliegenden Studie die *individuelle Veränderung* mittels des Reliable Change Index (RCI; Jacobson & Truax, 1991; z.B. Donnellan, Conger & Burzette, 2007; Watson & Humrichous, 2006) untersucht. Individuelle Veränderungen der Persönlichkeitsdimensionen wurden bisher vorwiegend in jüngeren Stichproben (z.B. De Fruyt et al., 2006; Lüdtke et al., 2009; Prinzie & Dekovic, 2008; Roberts, Caspi & Moffitt, 2001; Robins et al., 2001) und selten bei älteren Stichproben (Löckenhoff et al., 2008; Van Aken, Denissen, Branje, Dubas & Goossens, 2006) beschrieben. In diesen Analysen ist jeweils der prozentuale Anteil reliabler Veränderungen auf der individuellen Ebene angegeben worden. Löckenhoff et al. (2008) fanden in einer Stichprobe mit großer Altersspanne (31-88 Jahre) in allen fünf Persönlichkeitsdimensionen reliable Persönlichkeitsveränderungen. Während bei der stabilsten Persönlichkeitsdimension Offenheit für Erfahrungen 12.6% der Personen eine reliable Veränderung erlebten, zeigten bei Extraversion 20.4% der Personen eine reliable Veränderung. Je älter die Studienteilnehmer waren, desto kleiner war die Wahrscheinlichkeit, dass sie eine reliable Veränderung erlebt hatten. Bisher ist jedoch wenig darüber bekannt, in welchem Ausmaß reliable Persönlichkeitsveränderungen spezifisch im mittleren Erwachsenenalter stattfinden.

Persönlichkeitsentwicklung im mittleren Erwachsenenalter

In der Logik der Lebensspannenpsychologie ist das „Erste Alter“ das Vorberufsalter, das „Zweite Alter“ oder mittlere Alter das Berufs- oder Erwerbsalter, das „Dritte Alter“ das

Nachberufsalter bis zum Erreichen der mittleren Lebenserwartung und das „Vierte Alter“ das durch starke Ressourcenverluste gekennzeichnete hohe Alter über 85 Jahre (M. Martin & Kliegel, 2008). Das mittlere Erwachsenenalter ist also wesentlich durch die Auseinandersetzung mit berufsbezogenen Anforderungen gekennzeichnet, sei es innerhalb der Berufstätigkeit, die Vereinbarkeit von Beruf und Familie, die Karriereplanung, die Vorsorge für die nachberufliche Phase oder den Umgang mit Erwerbslosigkeit. Um eine Überschneidung der Altersbereiche zu vermeiden, konzentrieren wir uns in der vorliegenden Arbeit auf das mittlere Alter zwischen 40 und 60 Jahren, das durch die höchsten beruflichen Anforderungen gekennzeichnet ist (M. Martin & Mroczek, in Druck; Moen & Wethington, 1999). In dem Ausmaß, in dem Anforderungen in der Population mittelalter Personen in gleicher Weise und zum gleichen Zeitpunkt auftreten und in dem Maße, in dem die Auseinandersetzung zu einer Veränderung von Persönlichkeit führt, können auch im mittleren Alter Mittelwertsveränderungen von Persönlichkeitseigenschaften erwartet werden. Der hohe Druck zur Anpassung an ein bestimmtes berufliches Umfeld kann im Mittel eine Zunahme an Gewissenhaftigkeit bewirken. Neben dem beruflichen Engagement erreicht auch die Generativität, das Kümmern um jüngere Generationen, im mittleren Alter seinen Höhepunkt (McAdams, 2001). Es könnte erwartet werden, dass diese Anforderung im Mittel einen Anpassungsprozess in Richtung einer Zunahme an Gewissenhaftigkeit und Verträglichkeit bewirkt.

Typische Anforderungen des mittleren Alters treten jedoch nicht unbedingt gleichzeitig und nicht bei allen Personen auf. Tatsächlich kann das mittlere Erwachsenenalter als eine Zeit von vielfältigen und interindividuell unterschiedlichen Herausforderungen beschrieben werden, welche einen Auseinandersetzungsprozess bedürfen und von Anpassungen der Persönlichkeit begleitet sein können (Lachman, 2004). Zu interindividuellen Unterschieden können im mittleren Erwachsenenalter die Vielzahl von sozialen Rollen und die komplexen Wechselwirkungen zwischen den Rollen beitragen (Antonucci, Akiyama & Merline, 2001). Außerdem zeigen sich bei den Erwachsenen im Verlaufe des mittleren Alters in unterschiedlich starkem Ausmaß erste Anzeichen physischen und mentalen Abbaus, welche möglicherweise bei einigen Personen Anpassungsprozesse wie eine Abnahme in der Extraversion bewirken können. Eine weitere Herausforderung im mittleren Erwachsenenalter, welche zu unterschiedlichen Zeitpunkten und unterschiedlich stark auftritt, stellt der Umgang mit Gebrechlichkeit und Sterben der eigenen Eltern dar (Putney & Bengtson, 2001). Ist eine Person stark in der Pflege der eigenen Eltern engagiert, kann dies das Wohlbefinden stark negativ beeinflussen und möglicherweise mit einer Zunahme an Neurotizismus im

Zusammenhang stehen (Savla, Almeida, Davey & Zarit, 2008). Darüber hinaus unterscheiden sich Personen auch darin, wie stark sie auf die Ereignisse und Anforderungen reagieren, wie sensitiv eine Person also für Persönlichkeitsveränderungen ist. Die Unterschiedlichkeit und die Ungleichzeitigkeit des Auftretens von Herausforderungen lassen interindividuelle Unterschiede in der Richtung der Persönlichkeitsentwicklung erwarten, die Unterschiede in der Sensitivität interindividuelle Unterschiede in der Stärke der Veränderung.

Es kann angenommen werden, dass Mittelwertsveränderungen auftreten, wenn bei allen Personen gleiche und gleichzeitige Reifungsprozesse oder Umwelteinflüsse wirksam werden. Da die Anforderungen über das mittlere Erwachsenenalter intra- und interindividuell variieren, würde perfekte differentielle Stabilität nahelegen, dass Persönlichkeitsentwicklung vor allem einen Reifungsprozess darstellt, die individuellen Entwicklungskontexte dagegen nur einen geringen Einfluss auf die Persönlichkeitsentwicklung haben. Liegen tiefere Stabilitätswerte vor, kann im Gegensatz dazu angenommen werden, dass Mechanismen wirksam geworden sind, welche auf der individuellen Ebene zu Veränderungen geführt haben und die Rolle von Reifungsprozessen geringer ist.

Insgesamt können Mittelwerte der Persönlichkeitseigenschaften stabil, zunehmend oder abnehmend verlaufen, die Rangorder (oder differentielle Stabilität) zwischen Personen stabil oder verändert sein (insbesondere wenn in Auseinandersetzung mit Anforderungen die Richtung der Entwicklung interindividuell unterschiedlich ist) und individuelle Verläufe einzelner Persönlichkeitseigenschaften stabil, zunehmend oder abnehmend sein. Beobachtet man auf allen Ebenen Stabilität, dann verändert sich Persönlichkeit im mittleren Alter nicht trotz wechselnder Umwelt- bzw. berufsbezogenen Anforderungen. Dies wäre dann der Fall, wenn Personen jeweils die Umwelten aufsuchen, in denen eine Veränderung der Persönlichkeit selbst nicht erforderlich ist (Persönlichkeitsentwicklung als Umwelt*selektion*). Verändern sich alle Personen in der Population zur gleichen Zeit, in der gleichen Richtung und im gleichen Ausmaß, dann wird dies durch Mittelwertsveränderungen bei gleichzeitiger Rangstabilität sichtbar. In diesem Fall kann Persönlichkeitsentwicklung als *Reifung* in dem Sinn betrachtet werden, dass durchaus spezifisch unterschiedliche Umweltanforderungen in gleicher Weise zu Persönlichkeitsveränderungen führen würden. Verändern sich alle Individuen in der Population unterschiedlich stark, aber in die gleiche Richtung, dann ist die Mittelwertsveränderung nicht repräsentativ für die individuellen Veränderungen und es kann eine geringe differentielle Stabilität beobachtet werden. In diesem Fall wäre Persönlichkeitsentwicklung eine Frage der individuellen *Sensitivität* in der Reaktion auf Umweltveränderungen. Beobachtet man Veränderungen in unterschiedliche Richtungen und

unterschiedliche Stärke und zu unterschiedlichen Zeiten, dann könnte der Mittelwert sogar stabil bleiben und wäre keinesfalls repräsentativ für die intraindividuellen Veränderungen. In diesem Fall wird Persönlichkeitsentwicklung vor allem durch die individuelle Auseinandersetzung mit Ereignissen und die individuelle *Adaptation* an spezifische Anforderungen bestimmt und die differentielle Veränderung kann als Indikator der Plastizität von Persönlichkeit angesehen werden. Die von uns vorgeschlagenen Indikatoren für Persönlichkeitsentwicklung sind also statistisch wie konzeptionell distinkt. Zur Illustration kann das Beispiel eines Arbeitsplatzverlustes dienen: Unter der Selektionshypothese würde die Person im Fall eines Arbeitsplatzverlustes zur Stabilisierung der Persönlichkeit einen neuen Arbeitsplatz mit möglichst ähnlichen Anforderungen und Strukturen wie die verlorene Arbeitsstelle suchen. Unter der Reifungshypothese wäre der Effekt auf die Persönlichkeit der gleiche wie von jedem anderen berufsbezogenen Ereignis. Trifft die Sensitivitätshypothese zu, dann hängt es vom neuen Arbeitsplatz ab, in welchem Ausmass sich eine bestimmte Persönlichkeitsdimension entwickelt (also beispielsweise eine kleinere oder eine größere Zunahme an Offenheit), trifft die Adaptationshypothese zu, dann bestimmt der neue Arbeitsplatz, in welche Richtung sich Persönlichkeitseigenschaften verändern.

Forschungsanliegen

Die vorliegende Studie zielt darauf ab mittels dreier Typen von Stabilität und Veränderung die Persönlichkeitsentwicklung im mittleren Erwachsenenalter über 12 Jahre hinweg differenziert zu beschreiben. In Bezug auf vorliegende Forschungsergebnisse werden im Durchschnitt eine Zunahme von Verträglichkeit und Gewissenhaftigkeit sowie eine Abnahme von Neurotizismus erwartet. Eine Abnahme in Neurotizismus kann auf Grund einer Verbesserung der Coping-Strategien über die Lebensspanne erwartet werden. Nach Labouvie-Vief und Blanchard-Fields (1982) nimmt die Komplexität der Verknüpfung von Emotionen und Kognitionen über das Erwachsenenalter hinweg zu, was zu einer verbesserten Emotionsregulation führen kann. Eine Zunahme von Gewissenhaftigkeit und Verträglichkeit im mittleren Erwachsenenalter könnte auf Grund der starken beruflichen und familiären Einbindung und der in den verschiedenen sozialen Rollen entstehenden Druck zur Anpassung erwartet werden. Für die Persönlichkeitsdimensionen Extraversion und Offenheit wird eine leichte Abnahme oder keine Mittelwertsveränderung angenommen. Mit Blick auf bisherige Befunde zur differentiellen Stabilität, können mittlere bis hohe Stabilitätswerte erwartet werden, da einerseits die Persönlichkeit ein relativ stabiles Konstrukt darstellt und andererseits Rangverschiebungen auf Grund von individuellen Veränderungen erwartet werden können. Schließlich soll das Ausmaß dieser individuellen

Persönlichkeitsveränderungen untersucht werden, damit im Unterschied zu den Mittelwertsveränderungen geprüft werden kann, wie sehr sich die Erwachsenen mittleren Alters unterschiedlich voneinander entwickeln. Die Ergebnisse der Studie von Löckenhoff et al. (2008) sprechen dafür, dass von ca. 10-20% der Erwachsenen im mittleren Alter in einzelnen Persönlichkeitsdimensionen eine reliable Zu- oder Abnahme erwartet werden kann.

4.1.2 Methode

Stichprobe

Im Rahmen der vorliegenden Studie wird auf die Daten einer Teilstichprobe der „Interdisziplinären Längsschnittstudie des Erwachsenenalters“ (ILSE; z.B. M. Martin, Grünendahl & P. Martin, 2001) zurückgegriffen. Dabei handelt es sich um eine Längsschnittstudie zweier Kohorten aus den Geburtsjahrgängen 1930-1932 und 1950-1952. Mit den Datenerhebungen wurde 1994 (T1) begonnen. 1998 (T2) und 2006 (T3) folgten die Nacherhebungen (ausführliche Informationen zur Stichprobenziehung und zur Datenerhebung finden sich in P. Martin & M. Martin, 2000, S. 17-27).

In der vorliegenden Studie beziehen wir uns explizit auf das mittlere Lebensalter und verwendeten deshalb die Daten der zweiten Alterskohorte (für Befunde zur älteren Kohorte, siehe Allemand et al., 2008). Außerdem wurden nur die Daten derjenigen Personen in die Analysen miteinbezogen, welche zu allen drei Zeitpunkten an den Erhebungen teilgenommen haben. Von insgesamt 705 mittelalten Erwachsenen lagen für die drei Messzeitpunkte 323 komplette Datensätze der Persönlichkeitserfassung vor. Von diesen Personen waren 153 (47.4 %) weiblich und 165 (51.1 %) männlich. Das Durchschnittsalter beim ersten Messzeitpunkt betrug 43.8 Jahre (SD = 0.92).

Da Unterschiede zwischen Studienabbrechern und Studienteilnehmern einen Einfluss auf die Höhe und die Art der Stabilität und Veränderung der Persönlichkeitsdimensionen haben können (Rosnow & Rosenthal, 2005), wurden die Studienabbrecher und Studienteilnehmer hinsichtlich demografischer Variablen und Persönlichkeitsdimensionen miteinander verglichen.[3] Eine Analyse des Stichprobenausfalls ergab, dass von den 382 Studienabbrechern 49.5% weiblich waren, was sich nicht signifikant von der Geschlechterverteilung bei den Studienteilnehmern unterscheidet, $\chi^2(1) = 0.21$, $p > .05$. Die Studienteilnehmer zeigten sich jedoch signifikant zufriedener mit der eigenen Gesundheit (M

[3] Die unterschiedlichen Freiheitsgrade in der folgenden Analyse des Stichprobenausfalls lassen sich damit erklären, dass einzelne der verglichenen Variablen zu T1 fehlende Werte aufweisen.

= 3.83, *SD* = 0.91) als die Studienabbrecher (*M* = 3.65, *SD* = 1.05), *t*(687) = 2.42, *p* < .05, *r* = 0.09. Außerdem wiesen die Studienteilnehmer eine signifikant bessere kristalline kognitive Leistung auf (*M* = 16.48, *SD* = 3.94) im Vergleich zu den Studienabbrechern (*M* = 15.69, *SD* = 4.57), *t*(698) = 2.42, *p* < .05, *r* = 0.09. Schließlich verfügten die Studienteilnehmer über eine signifikant längere Schul- und Berufsausbildung (*M* = 14.29, *SD* = 2.45) als die Studienabbrecher (*M* = 13.75, *SD* = 2.58), *t*(688) = 2.81, *p* < .05, *r* = 0.11. Der Vergleich der Daten des ersten Messzeitpunktes zwischen Studienabbrechern und –teilnehmern ergab keine signifikanten Unterschiede hinsichtlich der eingeschätzten Lebenszufriedenheit und der für diese Studie zentralen Persönlichkeitsvariablen.

Von den 382 Studienabbrechern haben 176 Personen an zwei Erhebungswellen teilgenommen; davon 166 Personen zu T1 und T2, 7 Personen zu T1 und T3 und 3 Personen zu T2 und T3. In einer zusätzlichen Ausfallanalyse haben wir untersucht, ob sich Studienteilnehmer in der Entwicklung der Mittelwerte der Persönlichkeitsdimensionen im Zeitraum T1-T2 von den 166 Personen unterscheiden. Es zeigte sich kein Interaktionseffekt: Die Mittelwertsentwicklung war im Zeitraum T1-T2 nicht davon abhängig, ob die Person auch an der dritten Erhebungswelle teilgenommen hat oder nicht, *F*(5, 483) = 1.79, n.s.. Die Anzahl der Personen, welche nur zu T1 und T3 (7 Personen) beziehungsweise nur zu T2 und T3 (3 Personen) an den Erhebungen teilgenommen haben, ist sehr klein, daher wurden für diese Zeiträume keine Ausfallanalysen durchgeführt.

Insgesamt fanden sich keine Unterschiede in den fünf Persönlichkeitsdimensionen zwischen den Studienabbrechern und den Studienteilnehmern. Auch die Mittelwertsveränderungen scheinen sich zwischen Studienteilnehmern und Studienabbrechern nicht zu unterscheiden. Die Studienabbrecher wiesen jedoch tendenziell ein niedrigeres Bildungsniveau, eine niedrigere kristalline Intelligenz und eine schlechtere subjektive Gesundheit im Vergleich zu den Studienteilnehmern auf. Die Effekte sind allerdings klein und daher ist anzunehmen, dass diese Unterschiede die Ergebnisse nicht entscheidend beeinflusst haben (vgl. Roberts et al., 2006).

Messinstrumente

Die fünf Persönlichkeitsdimensionen wurden anhand der deutschen Fassung des NEO-Fünf-Faktoren Inventar (NEO-FFI; Borkenau & Ostendorf, 1993; Costa & McCrae, 1992) erfasst. Beim NEO-FFI handelt es sich um ein faktorenanalytisch konstruiertes Fragebogenverfahren, welches der Erfassung individueller Merkmalsausprägungen in den Bereichen Neurotizismus, Extraversion, Offenheit für Erfahrungen, Verträglichkeit und Gewissenhaftigkeit dient. Jede der fünf Skalen ist aus 12 Items zusammengesetzt. Zur

Bewertung der 60 Aussagen des Inventars stand den Studienteilnehmern eine fünffach abgestufte Likert-Skala von 0 (*starke Ablehnung*) bis 4 (*starke Zustimmung*) zur Verfügung. Schätzungen der internen Konsistenz nach Cronbach's α sind in Tabelle 4.2 dargestellt.

Statistische Analyseverfahren

Das Ziel der Studie ist die Prüfung der Frage, wie sich die Persönlichkeit im mittleren Erwachsenenalter auf der Stichprobenebene und der individuellen Ebene entwickelt. In einem ersten Schritt wurden zur Berechnung der differentiellen Stabilität der Persönlichkeit für alle drei Messzeiträume Test-Retest Korrelationen ermittelt. Zur Überprüfung von Korrelationsunterschieden wurden Vergleiche mittels Steiger's *z*-Test für abhängige Korrelationen durchgeführt (Steiger, 1980). In einem zweiten Analyseschritt wurde mittels einfaktorieller Varianzanalyse mit Messwiederholung (ANOVAR) Mittelwertsveränderungen in den fünf Persönlichkeitsdimensionen über die Zeit untersucht. Im Anschluss sind Kontrasthypothesen (nach Bonferroni) gerechnet worden. Im Mittelpunkt des dritten Auswertungsschrittes stand die Betrachtung individueller Veränderungen der Persönlichkeit. Veränderungen auf individueller Ebene werden oftmals mit Hilfe von Differenzwerten oder residualen Veränderungswerten berechnet. Da jedoch individuelle Werte über verschiedene Messzeitpunkte auf Grund von Messfehlern fluktuieren können, wurde von verschiedenen Autoren der Reliable Change Index (RCI; Christensen & Mendoza, 1986; Jacobson & Truax, 1991; siehe z.B. Roberts et al., 2001; Robins et al., 2001; Watson & Humrichouse, 2006) zur Untersuchung von individueller Veränderung eingesetzt. Der RCI bietet einen strengen Test der Hypothese von individueller Veränderung, da er explizit die Unzuverlässigkeit von Messungen einberechnet und so reliable Persönlichkeitsveränderungen von Veränderungen durch Messfehler trennt (Donnellan et al., 2007). Die Berechnung des RCI erfolgt folgendermaßen:

1) $$RC = (X_2 - X_1) / S_{diff}$$

X_1 repräsentiert den Wert einer Person zu Zeitpunkt 1, X_2 den Wert der gleichen Person zu Zeitpunkt 2 und S_{diff} stellt den Standardfehler des Unterschieds zwischen den zwei Testwerten dar. Dieser kann mit Hilfe des Standardmessfehlers berechnet werden:

2) $$S_{diff} = \sqrt{2(SE)^2}$$

Der Standardmessfehler wird mittels Standardabweichung zu Zeitpunkt 1 (S_x) und Test-Retest Reliabilität (r_{xx}) berechnet:

3) $$SE = S_x\sqrt{1 - r_{xx}}$$

S_{diff} beschreibt die Verteilung der Veränderungswerte, welche erwartet würde, wenn keine effektive Veränderung stattgefunden hätte. RCI-Werte, welche kleiner als -1.96 oder grösser als 1.96 sind, würden kaum zufällig auftreten und werden daher als reliabel betrachtet (vgl. Jacobson & Truax, 1991). Außerdem würde bei einer zufälligen Veränderung eine Normalverteilung der RCI-Werte erwartet werden, mit annäherungsweise 2.5% unter -1.96 und 2.5% über 1.96, und 95% ohne Veränderung. In der vorliegenden Studie wurden auf Grund dieser Annahmen nach der Berechnung der RCI-Werte die Studienteilnehmer in drei Gruppen eingeteilt. In der ersten Gruppe finden sich Personen, bei welchen sich eine reliable Zunahme in einer bestimmten Persönlichkeitsdimension im untersuchten Zeitraum findet, die RCI-Werte also über 1.96 liegen. Die anderen zwei Gruppen stellen Personen dar, welche keine reliable Veränderung bzw. eine Abnahme in einer bestimmten Persönlichkeitsdimension aufweisen. Mittels Chi-Quadrat-Tests wurde im Anschluss überprüft, ob sich der Anteil tatsächlicher Veränderungen signifikant von den zufällig erwarteten Werten unterscheidet.

4.1.3 Ergebnisse

In den folgenden Abschnitten sind die Ergebnisse der Analysen dargestellt, welche untersucht haben 1) wie groß die differentielle Stabilität der Persönlichkeitsdimensionen über die Zeit ist, 2) ob sich im mittleren Erwachsenenalter Mittelwertsveränderungen in den Persönlichkeitsdimensionen finden und 3) in welchem Ausmaß Persönlichkeitsveränderungen auf der individuellen Ebene auftreten.

Differentielle Stabilität der Persönlichkeitseigenschaften

In einem ersten Auswertungsschritt wurden zur Einschätzung der differentiellen Stabilität Test-Retest Korrelationen berechnet (Tabelle 4.1). Die mittleren differentiellen Stabilitätskoeffizienten wurden über alle Persönlichkeitsdimensionen hinweg unter Verwendung der Fishers *z*- Transformation ermittelt (Charter & Larsen, 1983). Für den Zeitraum T1-T2 beträgt der mittlere Stabilitätskoeffizient $r = .71$, für den Zeitraum T2-T3 $r = .69$ und für den Zeitraum T1-T3 $r = .64$. Die mittlere Stabilität ist im Messzeitraum T1-T2 signifikant höher als im Messzeitraum T1-T3, Steiger's $z(322) = 2.33$, $p < .05$.

In einem zweiten Analyseschritt wurde untersucht, ob sich die fünf Persönlichkeitsdimensionen bezüglich ihrer differentiellen Stabilität signifikant voneinander unterscheiden. Offenheit für Erfahrungen zeigte sich im Messzeitraum T1-T2 signifikant stabiler ($r = .75$) als Neurotizismus ($r = .67$), Steiger's $z(322) = -2.13$, $p < .05$, und Gewissenhaftigkeit ($r = .67$), Steiger's $z(322) = 2.17$, $p < .05$. Auch im Messzeitraum T2-T3

findet sich für Offenheit für Erfahrungen signifikant mehr Stabilität (r = .76) als für Neurotizismus (r = .62), Steiger's z(322) = -3.42, p < .05. Zudem zeigte sich Offenheit für Erfahrungen im Messzeitraum T2-T3 signifikant stabiler als Verträglichkeit (r = .69), Steiger's z(322) = 2.01, p < .05. Im Messzeitraum T1-T3 unterscheiden sich die Persönlichkeitsdimensionen nicht signifikant in der Stabilität.

Tabelle 4.1 Test-Retest Korrelationen der fünf Persönlichkeitsdimensionen über drei Messzeitpunkte

Zeitraum	N	E	O	V	G
T1-T2	.67	.72	.75	.72	.67
T2-T3	.62	.70	.76	.69	.69
T1-T3	.62	.62	.69	.61	.65

Anmerkungen. N = 323. N: Neurotizismus, E: Extraversion, O: Offenheit für Erfahrungen, V: Verträglichkeit, G: Gewissenhaftigkeit. Alle Koeffizienten sind auf dem Niveau p < .01 signifikant.

Im Zentrum des dritten Auswertungsschrittes stand die Frage, ob die differentielle Stabilität der einzelnen Persönlichkeitsdimensionen von der Länge des Messzeitraums abhängig ist. Die Messzeiträume T1-T2 und T2-T3 unterschieden sich nicht signifikant bezüglich der Stabilität der fünf Persönlichkeitsdimensionen. Ein anderes Bild ergab sich beim Vergleich der Stabilitätskoeffizienten von T1-T3 mit T1-T2 bzw. T2-T3. Im deutlich längeren Zeitraum T1-T3 (r = .62) fand sich bei Extraversion signifikant weniger Stabilität als in T1-T2 (r = .72), Steiger's z (322) = 3.35, p < .01 und in T2-T3 (r = .70), Steiger's z (322) = 2.56, p < .05. Auch Offenheit für Erfahrungen weist im Zeitraum T1-T3 (r = .69) signifikant weniger Stabilität auf als in den Zeiträumen T1-T2 (r = .75), Steiger's z (322) = 2.37, p < .05 und T2-T3 (r = .76), Steiger's z (322) = 2.71, p < .01. Schließlich findet sich auch bei der Persönlichkeitsdimension Verträglichkeit weniger Stabilität in T1-T3 (r = .61) als in T1-T2 (r = .72), Steiger's z (322) = 3.68, p < .01 und in T2-T3 (r = .69), Steiger's z (322) = 2.50, p < .05.

Insgesamt deuten die Ergebnisse auf relativ stabile Persönlichkeitsdimensionen über die Zeit hin. Gleichzeitig weisen die Befunde auf individuelle Unterschiede in der Veränderung hin, da selbst bei eingeschränkten Reliabilitäten teilweise höhere Stabilitätswerte erwartet würden.[4] Die Höhe der differentiellen Stabilität ist teilweise von der Persönlichkeitsdimension und von der Länge des Messzeitraums abhängig.

[4] Differentielle Stabilitäten kleiner als 1 können ihre Ursache auch in eingeschränkten Reliabilitäten (internen Konsistenzen) der Messungen haben. Aus diesem Grunde wurden zusätzlich doppelt minderungskorrigierte

Mittelwertsveränderung der Persönlichkeitseigenschaften

Um der Frage nachzugehen, ob in den fünf Persönlichkeitsdimensionen Mittelwertsveränderungen über die drei Messzeitpunkte stattgefunden haben, wurden varianzanalytische Auswertungen vorgenommen.[5] Die Mittelwerte und Standardabweichungen sind in Tabelle 4.2 abgebildet. Zunächst wurde potentielle Einflüsse von Geschlecht und Bildungsniveau auf die Persönlichkeitsentwicklung untersucht (siehe z.B. Löckenhoff et al., 2008).[6] Es fanden sich keine signifikanten Geschlechtsunterschiede im Entwicklungsverlauf der Persönlichkeitseigenschaften, $F(10, 307) = 1.63$, n.s.. Die Persönlichkeitsentwicklung zeigte sich ebenfalls unabhängig vom Bildungsniveau, $F(20, 616) = 1.37$, n.s.. Die nachfolgenden Auswertungen wurden deshalb bezogen auf die Gesamtstichprobe durchgeführt.

Tabelle 4.2 Mittelwerte, Standardabweichungen und Schätzungen der internen Konsistenz der fünf Persönlichkeitsdimensionen zu den drei Messzeitpunkten

	T1 (1994)			T2 (1998)			T3 (2006)		
Skala	M	SD	α	M	SD	α	M	SD	α
Neurotizismus	1.47	0.59	.81	1.30	0.58	.84	1.42	0.62	.86
Extraversion	2.40	0.47	.71	2.38	0.46	.71	2.31	0.49	.77
Offenheit	2.30	0.45	.60	2.27	0.45	.66	2.28	0.44	.66
Verträglichkeit	2.64	0.41	.63	2.67	0.42	.71	2.68	0.40	.70
Gewissenhaftigkeit	2.93	0.44	.76	2.92	0.42	.76	2.92	0.43	.77

Anmerkungen. $N = 323$.

Die varianzanalytische Analyse weist auf signifikante Veränderungen in der Persönlichkeitsdimension Neurotizismus über die Zeit hin, $F(2, 644) = 19.18$, $p < .001$, $\eta^2_p = 0.06$. Ebenfalls bestehen signifikante Unterschiede in der Skala Extraversion in Abhängigkeit vom Messzeitpunkt, $F(1.90, 613.35) = 11.12$, $p < .001$, $\eta^2_p = 0.03$. Hingegen zeigten sich in

Stabilitätskoeffizienten berechnet. Der Median war .95, mit einem Minimum von .77 und einem Maximum von 1.00. Noch genauer ließen sich die Werte mit State-Trait-Modellen ermitteln (vgl. Steyer, Schmitt & Eid, 1999).

[5] Die ANOVAR nimmt eine Gleichheit der Varianzen und der Korrelationen (respektive der Kovarianzen) über die Zeit hinweg an. Diese Bedingung wird in der vorliegenden Studie nur von den Persönlichkeitsdimensionen Neurotizismus und Gewissenhaftigkeit erfüllt, weshalb dann zur Korrektur dieser Fehlerquelle bei den anderen drei Dimensionen eine Greenhouse-Geisser-Adjustierung vorgenommen wurde. Diese bedeutet eine Berichtigung der p - Werte mittels Reduktion der Freiheitsgrade.

[6] Um den Einfluss von Geschlecht und Bildungsniveau auf die Persönlichkeitsentwicklung zu testen, wurden Pillai-Spur-Tests verwendet. Der Pillai-Spur Kennwert ist vergleichsweise unempfindlich gegenüber Heterogenität von Varianzen und Kovarianzen und ungleich grossen Stichproben.

den drei Messzeiträumen keine signifikanten Veränderungen in den Persönlichkeitsdimensionen Offenheit für Erfahrungen, $F(1.96, 630.17) = 0.91$, n.s., Verträglichkeit, $F(1.95, 626.45) = 2.73$, n.s., und Gewissenhaftigkeit, $F(2, 644) = 0.27$, n.s..
Es wurde vermutet, dass Neurotizismus über das mittlere Lebensalter hinweg tendenziell abnimmt (vgl. Roberts et al., 2006). Mittels Post-Hoc Test (nach Bonferroni) findet sich bei den Studienteilnehmern zum Messzeitpunkt T2 ein signifikant geringeres Ausmaß an Neurotizismus als zu Messzeitpunkt T1. Gegen Ende des mittleren Lebensalters (T3) zeigten die Studienteilnehmer entgegen der Erwartung wieder eine Zunahme an Neurotizismus. Im Vergleich dazu zeichnet sich bei der Persönlichkeitsdimension Extraversion eine Tendenz zu einer linearen Abnahme über die Zeit ab. Zu Messzeitpunkt T3 sind die Studienteilnehmer im Mittel weniger extravertiert als zu den Messzeitpunkten T1 und T2. Zu Messzeitpunkt T2 findet sich zwar leicht weniger Extraversion als zu Beginn des mittleren Lebensalters (T1), dieser Unterschied ist jedoch nicht statistisch signifikant.

Individuelle Veränderung der Persönlichkeitseigenschaften

Auf der Basis der RCI-Werte wurde der prozentuale Anteil an Individuen identifiziert, welche entweder eine reliable Zunahme, eine reliable Abnahme oder keine reliable Veränderung in den fünf Persönlichkeitsdimensionen erlebt haben. Um bestimmen zu können, ob bei einer überzufällig großen Anzahl an Individuen eine reliable Zu- oder Abnahme vorliegt, wurde im Anschluss mittels Chi-Quadrat Test die Verteilungen der RCI-Werte mit der Standardnormalverteilung verglichen. In Tabelle 4.3 sind die Prozentwerte in den drei Gruppen „reliable Abnahme“, „keine reliable Veränderung“, „reliable Zunahme“ und die Chi-Quadrat-Werte dargestellt. Insgesamt weisen die Befunde darauf hin, dass sich reliable Veränderungen für alle Persönlichkeitsdimensionen in allen Zeiträumen finden. 67.2% der Teilnehmer weisen mindestens eine reliable Veränderung in einer Persönlichkeitsdimension in mindestens einem Zeitraum auf.

Tabelle 4.3 Prozent der Individuen mit reliabler Veränderung der Persönlichkeitsdimensionen

	T1-T2				T2-T3				T1-T3			
Skala	A %	K %	Z %	$\chi^2(2)^a$	A %	K %	Z %	$\chi^2(2)^a$	A %	K %	Z %	$\chi^2(2)^a$
N	11.8	84.5	3.7	116.54	2.8	87.0	10.2	79.22	5.0	87.3	7.7	45.27
E	6.5	87.9	5.6	34.59	9.0	87.0	4.0	59.41	9.0	87.9	3.1	56.38
O	6.8	88.2	5.0	33.35	5.3	87.6	7.1	39.30	5.0	89.2	5.9	23.72
V	7.7	86.4	5.9	52.78	3.7	91.6	4.6	8.23	4.3	88.5	7.1	33.35
G	5.9	89.8	4.3	20.05	5.0	86.1	9.0	64.71	7.4	85.8	6.8	58.32

Anmerkungen. $N = 323$. [a] Alle Werte sind auf dem Signifikanzniveau $p < .05$ signifikant. N: Neurotizismus; E: Extraversion; O: Offenheit für Erfahrungen; V: Verträglichkeit; G: Gewissenhaftigkeit; A %: prozentualer Anteil der Personen mit einer reliablen Abnahme in der spezifischen Persönlichkeitsdimension; K %: prozentualer Anteil der Personen, ohne reliable Veränderung der spezifischen Persönlichkeitsdimension; Z %: prozentualer Anteil der Personen mit einer reliablen Zunahme in der spezifischen Persönlichkeitsdimension.

Die RCI-Analysen widerspiegeln bei Neurotizismus und Extraversion die oben beschriebenen Mittelwertsveränderungen. Beispielsweise erlebten im Messzeitraum T1-T2 11.8% der Teilnehmer eine reliable Abnahme in Neurotizismus und nur 3.7% eine reliable Zunahme. Im Vergleich dazu weisen die Persönlichkeitsdimensionen Offenheit, Verträglichkeit und Gewissenhaftigkeit, in welchen sich die Stichprobe im Mittel nicht verändert hat, in den Kategorien Zu- und Abnahme eine ähnlich große Anzahl an Personen mit reliabler Veränderung auf. Im Messzeitraum T1-T3 haben beispielsweise insgesamt 14.2% eine reliable Veränderung in Gewissenhaftigkeit erlebt, davon 7.4% eine Abnahme und 6.8% eine Zunahme. In der Abbildung 4.1 ist für jeden Messzeitraum einzeln der Anteil an Individuen dargestellt, bei welchen gar keine reliable Veränderung, eine reliable Veränderung oder auch mehrere reliable Veränderungen zu finden sind. Innerhalb eines Messzeitraums zeigen durchschnittlich 41.9% der Studienteilnehmer mindestens eine reliable Veränderung. Ca. 58% bis 72% dieser Personen erfahren in einem einzelnen Messzeitraum nur eine reliable Veränderung, 28% bis 42% erleben in mehr als einer Persönlichkeitsdimension eine reliable Veränderung.

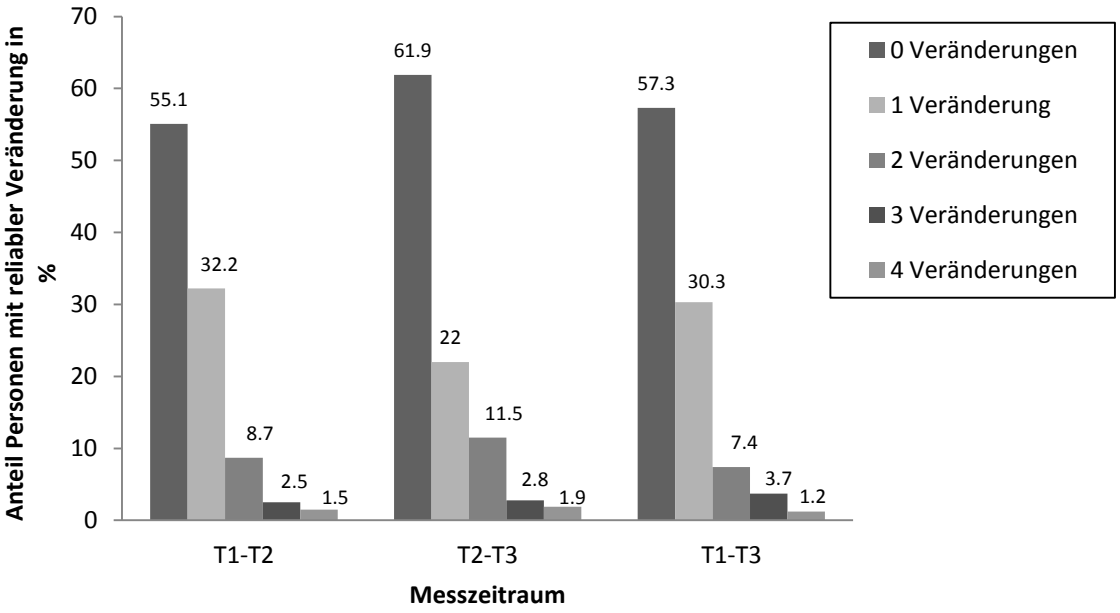

Abbildung 4.1 Kumulierte Häufigkeiten reliabler Veränderungen in den drei Messzeiträumen

4.1.4 Diskussion

Die vorliegende Studie untersuchte die Veränderbarkeit von Persönlichkeitseigenschaften in einer großen Stichprobe von Erwachsenen im mittleren Erwachsenenalter. Mit dem NEO-FFI (Borkenau & Ostendorf, 1993) wurde dabei ein sehr gut validiertes und etabliertes, allerdings auch im Hinblick auf die Feststellung von Veränderungen konservatives Messverfahren eingesetzt, das zur zeitstabilen Erfassung von Persönlichkeit konzipiert worden ist. Persönlichkeitsveränderungen in diesem Maß deuten daher auf starke und dauerhafte Veränderungen hin, die sich im Selbstbericht niederschlagen. Mit dem Maß wurden drei unterschiedliche Stabilitäts- und Veränderungstypen berücksichtigt sowie Veränderungen auf Stichprobenebene und Individuumsebene beschrieben. Die Stärke der Untersuchung liegt dabei in der Verwendung von Verlaufsdaten über drei Messzeitpunkte. Die Analysen früherer Studien zur Veränderbarkeit von Persönlichkeit beruhen oftmals auf Daten mit zwei Messzeitpunkten, womit Entwicklungsverläufe nur bedingt abgebildet werden können. Der kurvilineare Verlauf von Neurotizismus in der vorliegenden Studie beispielweise weist auf die Bedeutung der Verwendung von Methoden hin, welche nichtlineare Beziehungen zwischen Persönlichkeitsmerkmalen und Alter aufdecken können (Donnellan & Lucas, 2008).

Insgesamt weisen die vorliegenden Befunde auf eine relativ hohe Stabilität auf der Stichprobenebene hin. Gleichzeitig zeigten sich bedeutsame interindividuelle Unterschiede in der Persönlichkeitsentwicklung und insgesamt Belege für die Reifungs-, die Sensitivitäts- und die Adaptationshypothese.

Die *differentielle Stabilität* der Persönlichkeitsdimensionen lag im Bereich von r = .61 bis r = .76. Der Vergleich der mittleren Stabilitätskoeffizienten zeigte im längsten Messzeitraum signifikant geringere Stabilitätskoeffizienten auf, als im kürzesten Messzeitraum. Diese Befunde und die Höhe der Stabilitätskoeffizienten sind konsistent mit bereits vorliegenden Studien (z.B. Löckenhoff et al., 2008; Roberts & DelVecchio, 2000; Roberts, Helson & Klohnen, 2002). Relative hohe differentielle Stabilität im mittleren Erwachsenenalter wurde verschiedentlich mit einem inneren Gefühl von Konsistenz bzw. einer stark entwickelten Identität erklärt (Roberts et al., 2008; Roberts & DelVecchio, 2000). Stewart, Ostrove und Helson (2001) konnten beispielsweise in einer Untersuchung aufzeigen, dass Studienteilnehmer um das 40. und 50. Lebensjahr sich ihrer Identität sicherer fühlen als um das 30. Lebensjahr.

Mittelwertsveränderungen fanden sich bei Neurotizismus und Extraversion. Für die Persönlichkeitsdimension Neurotizismus lässt sich in der ersten kürzeren Zeitspanne eine Abnahme und in der zweiten längeren Zeitspanne eine Zunahme beschreiben. Die Abnahme von Neurotizismus im mittleren Erwachsenenalter entspricht den Erwartungen und wurde auch in der Studie von Costa, Herbst, McCrae und Siegler (2000) berichtet. Der Befund der durchschnittlichen Zunahme von Neurotizismus findet dagegen keine Entsprechung in der Literatur. Für Extraversion zeichnete sich eine Abnahme über das mittlere Erwachsenenalter ab. In der Metaanalyse von Roberts et al. (2006) fand sich im mittleren Erwachsenenalter kein eindeutiges Verlaufsmuster für Extraversion. Jedoch konnte in den querschnittlich angelegten Studien von Costa et al. (1986) und Donnellan und Lucas (2008) ebenfalls eine Abnahme in Extraversion festgestellt werden. Dieser Verlauf von Extraversion reflektiert möglicherweise ein sowohl physisch wie emotional niedrigeres Energieniveau gegen Ende des mittleren Erwachsenenalters (Carstensen & Charles, 1999). Im Gegensatz zu den Erwartungen und zu den Befunden von Roberts et al. (2006), zeichnete sich keine durchschnittliche Zunahme der Verträglichkeit und Gewissenhaftigkeit im mittleren Erwachsenenalter ab.

Die Analyse der *individuellen Veränderung* der Persönlichkeitsdimensionen ergab, dass 67.2% der Personen mindestens eine bedeutsame Zunahme oder Abnahme in einer Persönlichkeitsdimension in mindestens einem Messzeitraum erlebt haben. Während die individuellen Veränderungen in Neurotizismus und Extraversion die Mittelwertsveränderungen widerspiegeln, zeigen jeweils ca. 10% der Personen bedeutsame individuelle Veränderungen bei den auf Stichprobenebene relativ stabilen Persönlichkeitsdimensionen Offenheit, Verträglichkeit und Gewissenhaftigkeit. Bei diesen drei Persönlichkeitsdimensionen scheinen über die Zeit große Unterschied zwischen den

Studienteilnehmern zu existieren, welche beispielsweise durch eine Differenzierung der Umwelten, Aufgaben und Ressourcen im mittleren Erwachsenenalter erklärt werden könnten (Feldman, 2009).

Analysiert man das Befundmuster aus individuellen Veränderungen, differentiellen Veränderungen und Mittelwertveränderungen, so weisen zunächst auf der Stichprobenebene die Befunde auf relativ hohe Stabilität hin. Die aufgetretenen Mittelwertsveränderungen, wie beispielsweise die durchschnittliche Abnahme in Extraversion, können auf die gleichartige Wirkung von Umwelteinflüssen zurückgeführt werden, die von allen Personen geteilt werden. Mroczek und Spiro (2003) konnten bereits aufzeigen, dass der soziohistorische Kontext die Persönlichkeitsentwicklung beeinflussen kann. So könnten in der vorliegenden Untersuchung ökonomische Einflüsse auf den Arbeitsmarkt eine erhebliche Rolle gespielt haben. Zu Beginn des dritten Messzeitpunktes im Jahre 2005 erreichte in Deutschland die Arbeitslosenquote mit 13.0% einen historischen Höchststand in der deutschen Nachkriegsgeschichte (Bundesagentur für Arbeit, 2009) und einen noch höheren Wert für Erwerbsfähige über 50 Jahren. Da diese älteren Arbeitnehmer gefährdeter sind nach einem Arbeitsplatzverlust keine neue Stelle mehr zu finden, könnte die Zunahme von Neurotizismus mit der soziökonomischen Situation zumindest teilweise zusammenhängen. Für den amerikanischen Raum konnten Costa et al. (2000) und Scollon und Diener (2006) aufzeigen, dass der Verlust des Arbeitsplatzes und andere Verschlechterungen der Arbeitssituation im Zusammenhang mit einem Anstieg an Neurotizismus und einer Verringerung von Gewissenhaftigkeit im mittleren Erwachsenenalter stehen.

Da die Gleichzeitigkeit und Gleichartigkeit von Entwicklungseinflüssen im mittleren Erwachsenenalter nur für wenige Ereignisse angenommen werden kann (Moen & Wethington, 1999), ist es nicht verwunderlich, dass nicht bei allen Persönlichkeitsdimensionen Veränderungen auf der Mittelwertsebene zu finden sind. Durch die Ungleichzeitigkeit des Auftretens und die Unterschiedlichkeit der Ereignisse, scheinen bei den verschiedenen Personen Persönlichkeitsveränderungen nicht nur in unterschiedlicher Stärke (Sensitivitätshypothese), sondern teilweise in unterschiedliche Richtungen statt zu finden (Adaptationshypothese), was in den Befunden zu den Veränderungen auf individueller Ebene zum Ausdruck kommt. Hier finden sich, ebenso wie durch den Indikator für differentielle Stabilität, deutliche Hinweise auf Plastizität der Persönlichkeit und ausgeprägte Unterschiede zwischen den Personen. Diese individuellen Veränderungen basieren im mittleren Erwachsenenalter möglicherweise vorwiegend auf Veränderungen in sozialen Rollen und Kontexten. Dies ist im Einklang mit verschiedene Längsschnittstudien, die

aufgezeigt haben, dass Erfahrungen in bestimmten Entwicklungskontexten wie Arbeit und Beruf oder Ehe und soziale Beziehungen, mit unterschiedlichen Persönlichkeitsveränderungen einhergehen können (z.B. Elder, 1969; Roberts, 1997; Sturaro, Denissen, Van Aken & Asendorpf, 2008). Erst die Untersuchung anderer Alterskohorten, die unterschiedlichen historischen und ökonomischen Entwicklungsbedingungen ausgesetzt sind, werden zeigen können, welchen genauen Anteil Selektivität von Umwelten, Reifung, Sensitivität und Adaptation an der Persönlichkeitsentwicklung im mittleren Alter haben.

5. Study 3

5.1 Age and Gender Differences in Motivational Manifestations of the Big Five from Age 16 to 60[7]

5.1.1 Introduction

The Big Five personality traits have been proposed to summarize individual differences in enduring patterns of thoughts, feelings, and behaviors (John, Naumann, & Soto, 2008; McCrae & Costa, 2008). Recently, Denissen and Penke (2008a) broadened the Big Five framework by emphasizing motivational manifestations of the Big Five. Specifically, they conceptualized the Big Five as enduring individual differences in motivational reactions to circumscribed classes of environmental stimuli. The present study aimed to test substantive hypotheses with respect to age and gender differences in motivational manifestations of the Big Five from age 16 to 60. We present a broad theoretical rationale for the hypotheses based on socio-emotional and/or biological arguments. Previous studies on personality traits (including the Big Five) using established instruments show differences in age (cf. Roberts, Wood, & Caspi, 2008) and gender (e.g., Feingold, 1994) across the entire lifespan. However, it is not clear whether the motivational manifestations of the Big Five demonstrate similar age and gender patterns. This is an important lacuna in the literature because it ignores the demonstrated importance of goals and motivation for lifespan development (Heckhausen, Wrosch, & Schulz, 2010). To investigate the importance of such a motivational perspective, the present study aimed to compare age and gender trends in the Big Five as measured with the Five Individual Reaction Norm Inventory (FIRNI) with two established measures of the Big Five.

Denissen and Penke's (2008a) conceptualization of the Big Five as individual differences in motivation reactions to circumscribed classes of environmental stimuli is based on the behavioral ecological concept of reaction norms (for details on the conceptualization of the Big Five, see the Theoretical Rationale). An individual reaction norm describes the disposition of an organism to exhibit a specific class of behaviors, dependent on the environmental situation (Dingemanse et al., 2010; Nettle & Penke, 2010; Penke, Denissen, & Miller, 2007a, b). Furthermore, Denissen and Penke (2008a) included motivational

[7] A similar version of this chapter will be published elsewhere (Lehmann, Denissen, Penke, & Allemand, in revision)

components of personality traits in their model (see also Costa & McCrae, 1988; Winter, John, Stewart, Klohnen, & Duncan, 1998). According to Murray's (1938) classical theory, personality is driven by psychological needs and Costa and McCrae (1988) showed empirically that the Big Five can be factor-analytically indentified in a questionnaire that assesses Murray's 22 needs. The advantage of conceptualizing traits as motivational constructs is that it explicitly recognizes traits as interacting with environmental features to give rise to behavior aimed at satisfying certain needs. In order to measure these motivational manifestations of the Big Five, Denissen and Penke (2008a) developed the FIRNI and demonstrated empirical evidence for his reliability and validity.

Age Differences in the Big Five

Research on personality trait development demonstrated systematic age differences and age-related changes in the mean-levels of personality traits in adolescence and adulthood (e.g., Allemand, Zimprich, & Hendriks, 2008; Klimstra, Hale, Raaijmakers, Branje, & Meeus, 2009; Lucas & Donnellan, 2009; Lüdtke, Trautwein, & Husemann, 2009; McCrae et al., 2000; Roberts, Walton, & Viechtbauer, 2006; Srivastava, John, Gosling, & Potter, 2003). The general picture that emerged from both cross-sectional and longitudinal research suggests that adolescents tend to increase in extraversion and openness to experience, and tend to decrease in neuroticism. In adolescence, some gender differences have been reported in mean-level development. For example, Klimstra et al. (2009) showed an increase in emotional stability in boys aged 16 to 20, while girls increased in extraversion and openness to experience. No gender-specific development was found for agreeableness in this study, as girls as well as boys showed an increase in agreeableness during the age-period of 16 to 20. In contrast, age differences in personality seem to be more consistent across gender in adulthood. Specifically, research indicates that, from emerging adulthood through middle age, conscientiousness and agreeableness show positive age trends, while neuroticism demonstrates a negative trend, and extraversion and openness to experience show flat trends in both women and men. For example, Soto, John, Gosling, and Potter (2011) tested hypotheses about age differences in a large cross-sectional Internet sample (N = 1,267,128; ages 10 - 65) and found positive trends for mean levels of agreeableness and the self-discipline facet of conscientiousness. Neuroticism showed negative age trends across early adulthood and middle age while extraversion showed a small negative association during emerging adulthood and a relatively flat trend from young adulthood through middle age. Analysis of openness to experience revealed a positive age trend in mean levels across emerging adulthood that decelerates in middle age.

Several theoretical perspectives might explain age-related changes in personality during adolescence. Different developmental theories conceive this phase of life as a significant stage for social and personality development, with biological, cognitive, and social definitional changes (i.e., changes in the legal or social standing of the adolescent) as defining features (cf. Collins & Steinberg, 2006). First, there is growing evidence that maturational brain processes are continuing through adolescence (Giorgio et al., 2010; Paus, 2005), which might have an impact on personality development. Second, newly acquired cognitive structures like improvements in self-regulation might influence the way adolescents interact with their environment (Piaget, 1983; Tau & Peterson, 2010), which in turn might be associated with changes in personality in this phase of life (cf. Roberts et al., 2006). Third, social transitions are thought to bring along new social roles that may serve as focal points for personality trait development (Roberts & Wood, 2006). According to Roberts (2007), "growing up" can indeed be construed as a process in which children and adolescents conform to a series of ever increasing expectations from parents, friends, and society at large.

Two opposing theories have been used to explain age differences in personality traits across the whole lifespan. On the one hand, age-related mean-level differences have been explained by invoking species-universal genetic influences and intrinsic maturation processes (e.g., McCrae et al., 2000). According to some proponents of this theory, traits reach maturity around age 30 with only small changes after age 30 (Terracciano, Costa, & McCrae, 2006). On the other hand, personality trait development has been explained by the complex interplay between biological processes and individual reactions to changes in the environment (e.g., Baltes, Staudinger, & Lindenberger, 1999; Caspi & Roberts, 2001). This perspective also suggests that changes in personality can occur past age 30, and makes no explicit prediction regarding differences in amounts of change before and after age 30 (cf. Lucas & Donnellan, 2009; Srivastava et al., 2003).

Gender Differences in the Big Five

Studies on gender differences in personality traits in adolescence and adulthood reported modest effects with partly inconsistent results across studies (e.g., Chapman, Duberstein, Sörensen, & Lyness, 2007; Costa, Terracciano, & McCrae, 2001; Donnellan & Lucas, 2008; Schmitt, Realo, Voracek, & Allik, 2008; van Aken, Denissen, Branje, Dubas, & Goossens, 2006). In general, women tend to score higher on neuroticism and agreeableness, whereas gender differences in the other Big Five traits have been either inconsistent or of negligible magnitude. Furthermore, the described gender differences seem to be consistent across different ages in the lifespan (Chapman et al., 2007). Finally, Costa et al. (2001)

showed that gender differences are modest in magnitude, consistent with gender stereotypes, and replicable across 26 cultures.

Biological, sociocultural and biosocial models might explain gender differences in personality traits (cf. Feingold, 1994). For example, biological theories point to hormonal differences and their effects on mood and personality, and to sex-linked differences in genetic predispositions to psychopathology (Costa et al., 2001; Jang, Livesley, & Vernon, 1998). Evolutionary psychology implies that gender differences are originated through a causal process of sexual selection (Buss, 1995). Men and women differ, in this view, in domains in which they have faced different adaptive problems over human evolutionary history. In contrast, the sociocultural model of gender differences posits that social and cultural factors directly produce gender differences in personality traits (e.g. Eagly, 1987). Finally, integrating social and biological approaches, Schmitt et al. (2008) indicated that genetic personality predispositions of men and women are sensitive to certain contextual factors (e.g., environmental stress) in ways that differentially activate or suppress these predispositions.

Theoretical Rationale of the Present Study

The main objective of the current cross-sectional study was to examine age and gender differences in motivational manifestations of the Big Five using data from a large German-speaking Internet sample. To map out the patterning of age and gender differences in more detail, we used regression models with curvilinear effects. In line with Denissen and Penke's (2008a, p. 1298) theoretical call-to-arms, we present the theoretical rationale for our hypotheses based on socio-emotional and/or biological explanations. A second objective is to extend our analysis by comparing age and gender patterns in the Big Five traits as assessed by different measures. Specifically, we will explore age and gender differences in the Five Individual Reaction Norm Inventory (FIRNI; Denissen & Penke, 2008a), which is based on the motivational approach discussed above, and two traditional measures of the Big Five. This is the first study investigating age and gender differences in mean level scores obtained with instruments that assess personality traits from a motivational perspective.

The theoretical rationale will be organized as follows: For every Big Five trait we will present hypotheses about (1) age differences in the FIRNI, (2) gender differences in the FIRNI, (3) age × gender interactions in the FIRNI, and (4) hypotheses about differences between motivational and traditional conceptualizations of the Big Five.

Neuroticism. In our motivational framework, neuroticism reflects individual differences in people's sensitivity to signs of social exclusion (Denissen & Penke, 2008a, b).

(1) From a developmental task perspective (Havighurst, 1981), it can be assumed that adolescents are more sensitive to social exclusion than adults. Adolescence is a period when issues of acceptance by peers and romantic partners are particularly salient as adolescents work on the developmental tasks of autonomy and identity (Downey, Bonica, & Rincon, 1999). Although individuals of all ages face the possibility of rejection from a potential romantic partner or from a peer group, adolescents have fewer "grounding" experiences in long-term friendships or romantic relationships than adults and may therefore be especially sensitive to social rejection. Rejection sensitivity might decrease with age as more experience is acquired in managing romantic relationships and friendships. Related to this idea is the pronounced need of adolescents to fit in their peer group (Steinberg & Monahan, 2007). A strong need to fit in and for social approval has been linked to depressive symptoms (Rogers et al., 2010), which are associated with higher neuroticism (Kercher, Rapee, & Schniering, 2009). Moreover, research has shown that emotional autonomy increases with age (Steinberg & Silverberg, 1986). Finally, change of schools and associated change of classroom environments and social relationships during early adolescence might promote sensitivity to social exclusion which, in turn, might increase the need of reestablishing one's place in the social hierarchy (Eccles et al., 1993). In later adolescence, stability in the education environment might then facilitate a subsequent decrease in sensitivity to social exclusion. Based on these arguments and previous research, we assumed a negative association of neuroticism with age, particularly during adolescence and younger adulthood.

(2) In terms of gender differences, we expected women to be somewhat more neurotic than men. In social relationships, women tend to value emotional intimacy more than men (e.g., Belle, 1991) and are more focused on positive reciprocity (getting along), while men are more focused on negative reciprocity (getting ahead; Maccoby, 1990). Ultimately, the assumed higher sensitivity for social exclusion in women could be due to a greater dependency on enduring relationships during child-rearing (Denissen & Penke, 2008b; Troisi, 2001).

(3) Some empirical results suggest an age by gender interaction effect in neuroticism with women declining substantially throughout adulthood and men declining quite modestly (e.g., Srivastava et al., 2003). However, meta-analytic findings showed a complete lack of statistically significant relationship between gender and mean-level change in neuroticism (Roberts et al., 2006). Moreover, making normative commitments to conventional social institutions like work and family might support a positive development in traits associated with psychological maturity, such as sensitivity to social exclusion, similarly in both women

and men (see also Roberts & Wood, 2006). Therefore, we expected no age by gender interaction effect for neuroticism.

(4) We expected a more accentuated negative association between neuroticism and age in the FIRNI as compared to the traditional measures. While neuroticism in FIRNI is conceptualized as sensitivity to social exclusion, traditional measures of neuroticism focus on negative affectivity in general. It can be speculated that especially in late adolescence and early adulthood sensitivity to social exclusion shows a strong negative association with age due to an increased confidence regarding the interaction in social relationships. Partial support for this claim comes from research suggesting a decrease in social anxiety across adolescence (Ingles, La Greca, Marzo, Garcia-Lopez, & Garcia-Fernandez, 2010).

Extraversion. Denissen and Penke (2008a) conceptualized extraversion as individual differences in the activation of the reward system in social situations.

(1) During adolescence activation of the reward system in social situations might be positively associated with age due to salient developmental tasks regarding the establishment of social relationships with peers. Specifically, adolescents have to learn to establish close relationships and seek out exchanges that support a sense of self-identity, sensitivity for the needs of others, and maintenance of mutually oriented relationships with peers (Hartup & Stevens, 1997). In contrast, adults generally already have established social networks with close others and are used to interact in social relationships. In adulthood, individuals may even strive to reduce the absolute size of their social network to allow a focus on a more limited number of emotional rewarding relationships (Carstensen, Isaacowitz, & Charles, 1999). On the basis of these reflections and empirical results, one may expect a positive association of extraversion with age during adolescence and a negative association during adulthood.

(2) Regarding gender differences, research found higher values in affiliation motivation and sociability in women as compared to men (Czeschlik & Nürk, 1995; Mazur, 1989; Wong & Csikszentmihalyi, 1991). From a biological perspective, this gender-differential pattern might reflect females' role in nursing and defending offspring in the evolution of our species. Taylor et al. (2000) characterized the female responses to stress as "tend-and-befriend", involving caring for offspring, joining social groups to reduce vulnerability, and contributing to the development of social groupings, especially those involving female networks, for the exchange of resources and responsibilities. In the context of the principle "tend-and-befriend," the neuropeptide oxytocin has been mentioned repeatedly, a hormone that is released in response to sexual stimulation, uterine dilatation,

nursing, and in some situations, stress (Insel, 2010). Oxytocin is especially important in female reproduction and its effects on human affiliation have been ascribed to both attenuation of anxiety and activation of reward systems (Campbell, 2008). In line with theory and research, we expected women to be more extraverted than men. On the other hand, extraversion is related to greater sexual promiscuity, which should be more adaptive for men than for women according to evolutionary theories (Schmitt, 2004). This line of reasoning could provide an alternative account for greater extraversion in men.

(3) It might be argued that during adolescence the developmental tasks of learning to establish close relationships and other exchanges increase equally in its importance in girls and boys. Furthermore, both adult women and men might strive to reduce the absolute size of their social network to allow a focus on a more limited number of emotional rewarding relationships. Therefore, and on the basis of meta-analytic results (Roberts et al., 2006), we did not predict an age by gender interaction effect for extraversion.

(4) It might be suggested that traditional Big Five measures as compared to the FIRNI show less negative association between extraversion and age during adulthood due to their main focus on positive affect. For example, Charles, Reynolds, and Gatz (2001) reported stability in positive affect across young and middle adulthood. Moreover, Costa et al. (1987) suggested that positive affect is rather stable and less responsive to changing life circumstances.

Openness to experience. In the current motivational framework, openness to experience is conceptualized as the reward value of engaging in intellectual activity.

(1) From a biological perspective, recent studies of brain development suggest continued brain maturation and related increases in cognitive abilities until the age of 25 (Casey, Tottenham, Liston, & Durston, 2005; Giorgio et al., 2010; Schmithorst, Wilke, Dardzinski, & Holland, 2005). For example, maturation of the white matter is associated with psychometrically measured intelligence. IQ scores in turn have been reported to be consistently related to openness to experience (McCrae & Costa, 1997). In adolescence and young adulthood, brain maturation is in general paralleled by extensive education experiences. Education and school environment might additionally stimulate openness to experience (Cacioppo, Petty, Feinstein, Blair, & Jarvis, 1996). In contrast, late middle adulthood reflects a time where individuals are relatively "set in their ways." Only few individuals in late middle adulthood might experience new challenges in work and family life, or enroll in an educational institution. For example, for a sample of highly educated professionals Karp (1987) reported that the time period between 50 and 60 years brought

relatively little job change and work novelty began to diminish. At the same time, Kanfer and Ackerman (2004) suggested an age-related decrease in growth motives related to work features such as training and advancement in late middle adulthood what might be associated with declines in fluid intelligence and learning. Combined, less novelty, decreasing growth motives and cognitive decline also indicates a negative association of reward value of engaging in intellectual activity with age in late middle adulthood. In line with this reasoning and previous personality development research (Roberts et al., 2006), we expected a pronounced positive association of openness with age during adolescence and young adulthood, and a negative association in late middle adulthood.

(2) With respect to gender differences, men and women have been characterized in terms of different cognitive styles (objective evaluation of experience vs. subjective evaluation of experience; Gridley, 2006). Furthermore, Costa et al. (2001) reported higher mean scores for men in the openness facet of openness for ideas, which can be mapped onto Denissen and Penke's (2008a) motivational conceptualization of openness (since ideas can be seen as both the input and the result of intellectual activity). Because preferences and choices are sensitive to social conditions, it is difficult to determine whether biologically based sex differences in cognitive preferences, motives and styles also exist (Ceci, Williams, & Barnett, 2009; Spelke & Grace, 2006). Although the gender difference in the reward value of cognitive activity may not be innate, based on the results of previous empirical studies, we expected men to be more open to experience than women.

(3) Both girls and boys show continued brain maturation and related increases in cognitive abilities until the age of 25 (e.g., Tamnes et al., 2010). Furthermore, both women and men can be thought to be more "set in their ways" in late middle adulthood. In line with this reasoning and previous research (Roberts et al., 2006) we did not expect an age by gender interaction for openness to experience.

(4) For the traditional Big Five measures we expected a positive association between openness to experience and age in adolescence and rather small age effects in adulthood. In contrast, for the FIRNI we expected a positive association between openness and age during adolescence and young adulthood, and a negative association in late middle adulthood (i.e., curvilinear change). We suggest that curiosity in general is rather typical for adolescence while enjoying intellectual activity might still show a positive association with age during young adulthood. Moreover, we assume a negative association of reward value of engaging in intellectual activity with age in late middle adulthood as part of the decline in growth motives,

cognitive ability and novelty while curiosity in general might be thought as relatively stable across adulthood (Roberts et al., 2006).

Agreeableness. Agreeableness has been conceptualized as individual differences in the motivation to cooperate in resource conflicts (Denissen & Penke, 2008a).

(1) Regarding age differences in cooperative behavior, Szolnoki, Perc, Szabo, and Stark (2009) showed in a complex version of the prisoner's dilemma game that age influences the evolutionary process of strategy adoption. Specifically, they suggested that older individuals have had more possibilities to detect the (supposedly) higher pay-off of cooperative strategies, which explains why they cooperated more frequently. Based on these results, we expected adolescents and younger adults to be less agreeable than middle-aged adults.

(2) Previous research suggest that women, on average, are more cooperative than men (Solnick, 2001), particularly when other women are involved in the social exchange situation (Wischniewski, Windmann, Juckel, & Brüne, 2009). This pattern can be partly explained by gender-related differences in sex hormones and bonding hormones (Burnham, 2007; Kirsch et al., 2005; Kosfeld, Heinrichs, Zak, Fischbacher, & Fehr, 2005; Wischniewski et al., 2009). Furthermore, in evolutionary terms, the above-mentioned principle of "tend-and-befriend" (Taylor et al., 2000) might not only explain the gender differences in extraversion, but also account for gender differences in agreeableness. Hence, we expected women to be more agreeable than men.

(3) Getting more cooperative across adulthood can be linked to the maturity principle reported above for neuroticism (see Roberts & Wood, 2006). Acting more cooperatively might help both women and men to fulfill socially important roles. Therefore and on the basis of meta-analytic results (Roberts et al., 2006), we did not expect an age by gender interaction effect for agreeableness.

(4) For agreeableness, we do not suggest accentuated differences between the FIRNI and the traditional measures. As noted above, we expected a positive association between the motivation to cooperate in resource conflict and age. Similarly, previous research (e.g., Roberts et al., 2006) suggests a positive association between agreeableness as measured with traditional Big Five instruments and age.

Conscientiousness. Denissen and Penke (2008a) conceptualized conscientiousness as individual differences in the tenacity of goal pursuit under distracting circumstances.

(1) From a biological perspective, a major component of the neurological development during the transition from adolescence to young adulthood pertains to brain regions associated

with cognitive control (Steinberg, 2007). For example, Luna et al. (2001) showed in a functional MRI study that the development of the ability to voluntarily initiate and suppress behavior in humans is influenced by the maturation of integrated function among the neocortex, striatum, thalamus, and cerebellum, which were generally less activated in adolescents compared to adults. While during adolescence and young adulthood anatomical brain maturational changes might enhance the tenacity of goal pursuit under distracting circumstances, middle aged adults might further improve their tenacity of goal pursuit due to better goal setting and goal attainment strategies (Riediger, Freund, & Baltes, 2005). Furthermore, Rubia et al. (2006) demonstrated progressive age-related neurocognitive specialization of cognitive control during adulthood. In this study, more mature networks in frontal, parietal, and cingulate brain regions seemed to support the performance in cognitive control. In line with these results and previous research on personality development, we therefore expected a positive association of conscientiousness with age from adolescence to middle adulthood.

(2) In terms of gender differences, Luszczynska, Diehl, Gutiérrez-Doña, Kuusinen, and Schwarzer (2003) did not find differences in attention control in goal pursuit, which indicates gender similarity with respect to tenacity of goal pursuit. Similarly, Garavan, Hester, Murphy, Fassbender, and Kelly (2006) did not find gender differences in the performance of inhibitory control, although differences in regional brain activation were found. It can be assumed that although men and women faced different adaptive problems over human evolutionary history, the need for goal-directed behavior across a broad range of activities inhibited the development of gender differences in tenacity (Ardila, 2008). On the basis of this assumption and empirical results, we did not expect gender differences for conscientiousness.

(3) A positive association of tenacity of goal pursuit under distracting circumstances with age can be linked to becoming more functionally mature with age. Increases in this trait across adulthood might be equally important for women and men because people higher on this trait tend to be more effective in the tasks of social development (see Roberts & Wood, 2006). On the basis of these arguments and meta-analytic results (Roberts et al., 2006) we did not expect an age by gender interaction for conscientiousness.

(4) We do not expect accentuated differences between age trends in conscientiousness as measured with the FIRNI and traditional Big Five instruments. In line with the maturity principle (Roberts & Wood, 2006) it can be suggested that tenacity of goal pursuit under

distracting circumstances as well as variables like competence and dutifulness might serve to facilitate functioning in society and therefore should be positively associated with age.

5.1.2 Method

Participants

The participants were 19,022 German-speaking Internet users who completed the FIRNI online. The average age of participants was 24.94 years (*SD* = 10.09, range 16 to 60 years, *MD* = 21) and 69.1% were women. There was a broad range in educational attainment, with 37.4% reported to have completed basic education (German Hauptschule and Realschule) as their highest level of education, 42.7% had a high school degree (German Abitur), and 14.2% had graduated from university. Seven hundred twenty-two (3.8%) participants reported having no completed education. However, this group was very young in average (*M* = 18.18, *SD* = 5.39) and mostly consisted of individuals who had not completed formal schooling yet. Of the participants who completed the FIRNI, a subsample of 17,315 participants (91.03%) completed the subsequent PAS, and 16,500 participants (86.74%) completed the BFI, which was presented at the end of the questionnaire. No significant differences were observed between the subsamples and the total sample with regard to motivational manifestations of the Big Five, and age and gender distribution.

Procedure

The data were collected using the portal for online research of the Psychology Department of the Humboldt-University in Berlin (http://www.psytests.de/). This website offers its visitors free feedback on several surveys and personality measures. In return for their participation in the present study, participants received a personality profile after completion of the study.

Measurement

Five Individual Reaction Norms Inventory (FIRNI). The FIRNI was developed to measure enduring individual differences in people's motivational reactions to circumscribed classes of environmental stimuli (Denissen & Penke, 2008a). The FIRNI captures motivational tendencies with items that are framed in a way that differs from traditional inventories (while at the same time tapping into the same latent factor space as traditional Big Five measures). This measure consists of ten items for each Big Five domain (e.g., for neuroticism: "When I meet with friends I sometimes have the feeling that they talk badly about me afterwards," for extraversion: "Talking with other people motivates me and brings

out the best in me," for openness to experience: "I enjoy thinking of new ways to solve problems," for agreeableness: "I would rather share something than to compete with other people for having it all myself," for conscientiousness: "When I have set myself a goal I pursue it very persistently"). The items are answered on a 5-point Likert-type rating scale, ranging from 1 (*not at all*) to 5 (*completely*). Alpha-reliabilities in the present sample were α = .80 for neuroticism, α = .90 for extraversion, α = .82 for openness to experience, α = .82 for agreeableness and α = .86 for conscientiousness.

Big Five Inventory (BFI). The BFI is designed to efficiently measure the core aspects of each Big Five domain (John, Donahue, & Kentle, 1991; John et al., 2008). We used the German Version of the BFI (Lang, Lüdtke, & Asendorpf, 2001). The BFI consists of 44 items and includes short phrases based on the trait adjectives known to be prototypical markers of the Big Five. The items are rated on a Likert-type scale ranging from 1 (*disagree strongly*) to 5 (*agree strongly*). In the present sample, the internal reliability coefficients were α = .85 (neuroticism), α = .90 (extraversion), α = .84 (openness to experience), α = .78 (agreeableness), and α = .86 (conscientiousness).

Personality Adjective Scale (PAS). Second, we used an adjective-based measure of the Big Five based on a study by Ostendorf (1990), consisting of 60 bipolar pairs of adjectives (e.g., lazy – hardworking, talkative – silent). Participants were asked to assess the extent to which the adjective pair describes them in general. All adjective pairs were rated on a 6-point Likert-type scale, ranging from 1 (*only the left pole applies to me*) to 6 (*only the right pole applies to me*). The internal consistency coefficients were α = .92 (neuroticism), α = .95 (extraversion), α = .86 (openness to experience), α = .87 (agreeableness) and α = .92 (conscientiousness).

These three Big Five questionnaires were all developed to tap into the same latent factor space of the five broad domains of personality. However, with respect to the two traditional measures the FIRNI is based on a different conceptualization. Moreover, all measures differ in the item format. Specifically, both of the traditional measures are based on prototypical markers of personality, with the PAS consisting of marker adjectives to measure the Big Five traits (e.g., "aloof"), and the BFI consisting of short phrases and brief behavioral descriptions (e.g., "generates a lot of enthusiasm"). By comparison, the items in the FIRNI are strictly formulated to reflect motivational reaction norms underlying each of the Big Five personality traits (see above). Corresponding to this conceptualization, the items provide a situational cue (e.g., "interacting with other people") followed by a motivational reaction (e.g., "gives me a lot of energy").

Structural Invariance across Age Groups

To compare scale scores in different age groups, the factor structure should be invariant across ages. Previous studies using traditional Big Five personality measures such as the BFI, found a high degree of structural invariance across age groups (e.g., Lang et al., 2001; Soto et al., 2011; Srivastava et al., 2003). To test whether the FIRNI structure was invariant across ages, we split the sample into five age groups (16-19, 20-29-33, 30-39, 40-49, 50-60) and then conducted principal components analyses within each group, extracting five factors in each analysis. The Big Five personality traits clearly replicated within each age group. For each personality trait, factor congruence coefficients were then calculated between the set of factor loadings of each age group (Tucker, 1951; cf. Harman, 1976). McCrae and Costa (1997) and Davenport (1990) suggested that coefficients greater than .90 reflect strong similarity of structures. Across age groups, the average congruence coefficients were .98 for neuroticism (range: .97 to .99), .99 for extraversion (range: .97 to .99), .98 for openness to experience (range: .96 to 1.00), .99 for agreeableness (range: .98 to 1.00) and .99 for conscientiousness (range: .97 to 1.00). These congruence coefficients reflect a high degree of structural invariance. Finally, alpha reliabilities were computed for each of the five age groups. The reliabilities ranged from $\alpha = .77$ to $\alpha = .82$ for neuroticism, from $\alpha = .88$ to $\alpha = .90$ for extraversion, from $\alpha = .78$ to $\alpha = .82$ for openness, from $\alpha = .77$ to $\alpha = .84$ for agreeableness, and from $\alpha = .84$ to $\alpha = .87$ for conscientiousness. In general, the five age groups had very similar alpha reliabilities.

Statistical Analysis

First, all values were *z*-transformed in the full sample, so that a score of zero corresponds to the sample mean (across all age groups). Then, for all personality measures, analyses were conducted by predicting each trait from gender, age and higher order polynomials (curvilinear) of age using hierarchical regression analysis. Specifically, we first centered age (around the full sample mean of 24.94) and then tested linear, quadratic and cubic age effects. However, because the cubic trends were very difficult to interpret, in the following we only report the linear and quadratic trends. For the trait-level analyses, each age polynomial and its corresponding interaction with gender were included as a block in a hierarchical regression analysis and this block was retained if it met the significance criterion of p less than .01. Because we relied on the significance of the block as a whole as a decision rule for the regression analyses, individual predictors were sometimes retained in the final model even if they did not meet this threshold.

To facilitate interpretation and comparison of the different personality measure, we calculated *T* scores for each personality trait score within each scale. Scores were created with participants aged 30 to 34 as a reference group, following the procedure used by Donnellan and Lucas (2008). According to this, scores below 50 indicate trait levels that are lower than this reference group, whereas scores above 50 indicate traits levels that are higher than the reference group. In terms of Cohen's (1988) guidelines, a difference of 2 *T* score points represents a small effect, a difference of 5 points represents a medium effect, and a difference of 8 points represents a large effect.

5.1.3 Results

The results are presented as follows. In a first step, we report age and gender differences in the motivational manifestations of the Big Five. The second step involves a comparison of the age and gender effects in the motivational manifestations of the Big Five with age and gender effects as found for the two traditional measures.

Age and Gender Differences in the Motivational Manifestations of the Big Five

Table 1 displays mean and standard deviations for the raw scores by age categories and gender. Results of the regression analyses are presented in Table 3. Figures 1-5 shows the mean *T* scores for each of the Big Five personality traits for each age group, separately for men and women, with fit curves from the regression models. For four traits, quadratic age effects met our criterion of $p < .01$. An examination of the mean FIRNI scores and the plotted fit curves from regression models in the Figure 1-5 shows that for most of the traits, the deviations from a simple linear trend were substantial, thus more complex models sometimes contribute to a better description of age trends in the motivational manifestation of the Big Five. To facilitate an intuitive understanding of the magnitude of the age differences, we created five broader age groups (16- to 19-year-olds, 20- to 29-year-olds, 30- to 39 year-olds, 40- to 49-year-olds, 50- to 60-year-olds) and then identified the age group associated with the maximum score for each trait and the age group associated with the minimum score. Next, we computed the difference score between the two groups that is expressed in age 30-34 *T* units.

Table 5.1 Means and Standard Deviations for the Big Five Raw Scores by Age Categories, Scale, and Gender

Age group	Sample size		Neuroticism *M* (*SD*)		Extraversion *M* (*SD*)		Openness to exp. *M* (*SD*)		Agreeableness *M* (*SD*)		Conscientiousness *M* (*SD*)	
Scale	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
16-19												
FIRNI	5773	1850	3.06	2.93	3.47	3.28	3.44	3.62	3.55	3.37	3.19	3.19
			(0.66)	(0.67)	(0.81)	(0.81)	(0.66)	(0.71)	(0.66)	(0.74)	(0.67)	(0.69)
BFI	5014	1605	3.12	2.81	3.42	3.16	3.75	3.69	3.44	3.39	3.21	3.05
			(0.73)	(0.77)	(0.84)	(0.84)	(0.64)	(0.66)	(0.68)	(0.68)	(0.65)	(0.68)
PAS	5345	1719	3.35	2.98	4.36	4.03	4.76	4.81	4.13	4.19	3.99	3.83
			(0.92)	(0.96)	(1.11)	(1.12)	(0.63)	(0.66)	(0.79)	(0.82)	(0.82)	(0.89)
20-29												
FIRNI	4794	2327	2.97	2.83	3.37	3.18	3.65	3.86	3.58	3.43	3.23	3.20
			(0.69)	(0.70)	(0.75)	(0.78)	(0.63)	(0.63)	(0.60)	(0.64)	(0.71)	(0.71)
BFI	4373	2117	3.14	2.86	3.39	3.12	3.78	3.76	3.49	3.43	3.36	3.16
			(0.78)	(0.82)	(0.82)	(0.85)	(0.63)	(0.63)	(0.63)	(0.63)	(0.67)	(0.69)
PAS	4534	2215	3.45	3.11	4.29	3.90	4.84	4.87	4.20	4.28	4.13	3.94
			(0.98)	(1.02)	(1.06)	(1.11)	(0.62)	(0.64)	(0.76)	(0.75)	(0.85)	(0.88)
30-39												
FIRNI	1303	816	2.78	2.66	3.26	3.12	3.76	3.95	3.59	3.47	3.36	3.35
			(0.70)	(0.72)	(0.72)	(0.73)	(0.64)	(0.63)	(0.58)	(0.64)	(0.68)	(0.74)
BFI	1213	735	3.04	2.75	3.48	3.22	3.87	3.83	3.55	3.49	3.59	3.39
			(0.81)	(0.81)	(0.78)	(0.82)	(0.62)	(0.61)	(0.60)	(0.65)	(0.64)	(0.71)
PAS	1249	766	3.32	3.01	4.31	3.94	4.96	5.00	4.25	4.32	4.33	4.15
			(1.03)	(1.03)	(1.04)	(1.08)	(0.61)	(0.63)	(0.73)	(0.79)	(0.80)	(0.90)
40-49												
FIRNI	699	502	2.70	2.54	3.22	3.18	3.77	3.97	3.64	3.47	3.45	3.50
			(0.71)	(0.66)	(0.73)	(0.75)	(0.67)	(0.60)	(0.59)	(0.57)	(0.66)	(0.68)
BFI	649	465	2.98	2.64	3.47	3.32	3.86	3.90	3.63	3.59	3.69	3.56
			(0.80)	(0.82)	(0.79)	(0.81)	(0.61)	(0.60)	(0.59)	(0.57)	(0.62)	(0.65)
PAS	661	483	3.24	2.83	4.33	4.09	5.00	5.05	4.35	4.37	4.39	4.30
			(1.02)	(1.03)	(1.05)	(1.05)	(0.63)	(0.64)	(0.74)	(0.70)	(0.79)	(0.81)
50-60												
FIRNI	559	399	2.59	2.51	3.20	3.16	3.84	3.97	3.70	3.44	3.62	3.57
			(0.63)	(0.63)	(0.71)	(0.74)	(0.61)	(0.60)	(0.53)	(0.61)	(0.63)	(0.67)
BFI	160	169	2.88	2.62	3.48	3.37	3.89	3.89	3.74	3.57	3.81	3.57
			(0.73)	(0.82)	(0.70)	(0.83)	(0.63)	(0.66)	(0.60)	(0.66)	(0.53)	(0.70)
PAS	164	179	3.02	2.81	4.39	4.16	5.04	5.06	4.44	4.31	4.47	4.33
			(0.90)	(1.00)	(0.95)	(1.04)	(0.66)	(0.67)	(0.74)	(0.72)	(0.73)	(0.80)

Table 5.2 Estimates from Regression Models for FIRNI, BFI, and PAS

	FIRNI					BFI					PAS				
Variable	β	*T*	ΔR^2	*F*	*dfs*	β	*T*	ΔR^2	*F*	*dfs*	β	*T*	ΔR^2	*F*	*dfs*
Neuroticism															
Constant		-6.302*					-4.203*					-2.104			
Age	-0.238	-18.279*				-0.018	-1.389				0.034	2.648*			
Gender	-0.091	-9.961*				-0.174	-18.287*				-0.169	-18.096*			
Age × Gender	-0.010	-0.810	.049	329.206*	3, 19018	-0.016	-1.238	.034	191.928*	3, 16496	-0.002	-0.162	.029	174.154*	3, 17311
Age^2	0.053	4.231*				-0.050	-3.948*				-0.092	-7.484*			
Age^2 × Gender	0.015	1.041	.001	201.273*	5, 19016	0.014	1.029	.001	119.119*	5, 16494	0.011	0.816	.003	117.170*	5, 17309
Extraversion															
Constant		-8.667*					-7.302*					-9.490*			
Age	-0.152	-11.553*				0.043	5.314*				-0.053	-4.068*			
Gender	-0.103	-11.110*				-0.142	-18.153*				-0.156	-16.696*			
Age × Gender	0.022	1.672	.022	140.778*	3, 19018	0.024	3.003*	.020	112.404*	3, 16496	-0.001	-0.100	.023	133.872*	3, 17311
Age^2	0.083	6.527*									0.067	5.372*			
Age^2 × Gender	0.013	0.941	.002	91.119*	5, 19016						0.018	1.331	.002	86.233*	5, 17309
Openness															
Constant		15.086*					0.660					3.528*			
Age	0.327	25.392*				0.120	8.970*				0.165	12.674*			
Gender	0.133	14.718*				-0.018	-1.826				0.024	2.595*			
Age × Gender	0.003	0.205	.058	392.073*	3, 19018	0.034	2.539	.007	38.230*	3, 16496	-0.001	-0.095	.018	103.752*	3, 17311
Age^2	-0.179	-14.393*				-0.040	-3.150*				-0.050	-3.988*			
Age^2 × Gender	-0.006	-0.447	.011	282.058*	5, 19016	-0.020	-1.391	.001	25.201*	5 16494	0.004	0.313	.001	65.744*	5, 17309
Agreeableness															
Constant		-6.003*					-2.045					2.279			
Age	0.054	7.161*				0.091	11.337*				0.074	9.446*			
Gender	-0.117	-16.107*				-0.043	-5.479*				0.041	5.300*			
Age × Gender	-0.008	-1.125	.015	99.654*	3, 19018	-0.004	-0.469	.009	51.876*	3, 16496	-0.017	-2.162	.009	50.512*	3, 17311
Conscientiousness															
Constant		-0.691					-2.139					-1.466			
Age	0.161	21.530*				0.287	22.163*				0.210	16.247*			
Gender	-0.011	-1.524				-0.130	-13.848*				-0.099	-10.595*			
Age × Gender	0.007	0.956	.025	163.589*	3, 19018	-0.009	-0.721	.066	391.138*	3, 16496	-0.002	-.129	.034	201.471*	5, 17309
Age^2						-0.058	-4.663*				-0.048	-3.873*			
Age^2 × Gender						0.015	1.066	.001	240.254*	5, 16494	0.013	0.978	.001	124.636*	5, 17309

Note. FIRNI: N = 19,022. Age is mean-centered at 24.94. BFI: N = 16,500. Age is mean-centered at 24.2. PAS: N = 17,315. Age is mean-centered at 24.1. Gender is contrast-coded: female = -1, male = 1. Change in R^2 values is reported for each block of variable, but the coefficients are from the final models.
*p < .01

Neuroticism. Figure 1 shows the regression curves and the mean *T* scores at each age for neuroticism, separately for men and women. We expected a negative association of neuroticism with age. In line with our hypothesis, older individuals tended to be less neurotic than younger individuals. Moreover, the quadratic model indicates that the negative relation between neuroticism and age was more pronounced in younger than in older age such that there was a almost medium difference (4.16 *T* units) between the youngest age group and the 30- to 39-year olds, whereas there was a small difference between the 30- to 39-year olds and the oldest age group (2.44 *T* units). Consistent with our hypothesis, women were more neurotic than men over the lifespan. In contrast to previous studies, we were not able to find an age by gender interaction effect with respect to FIRNI neuroticism.

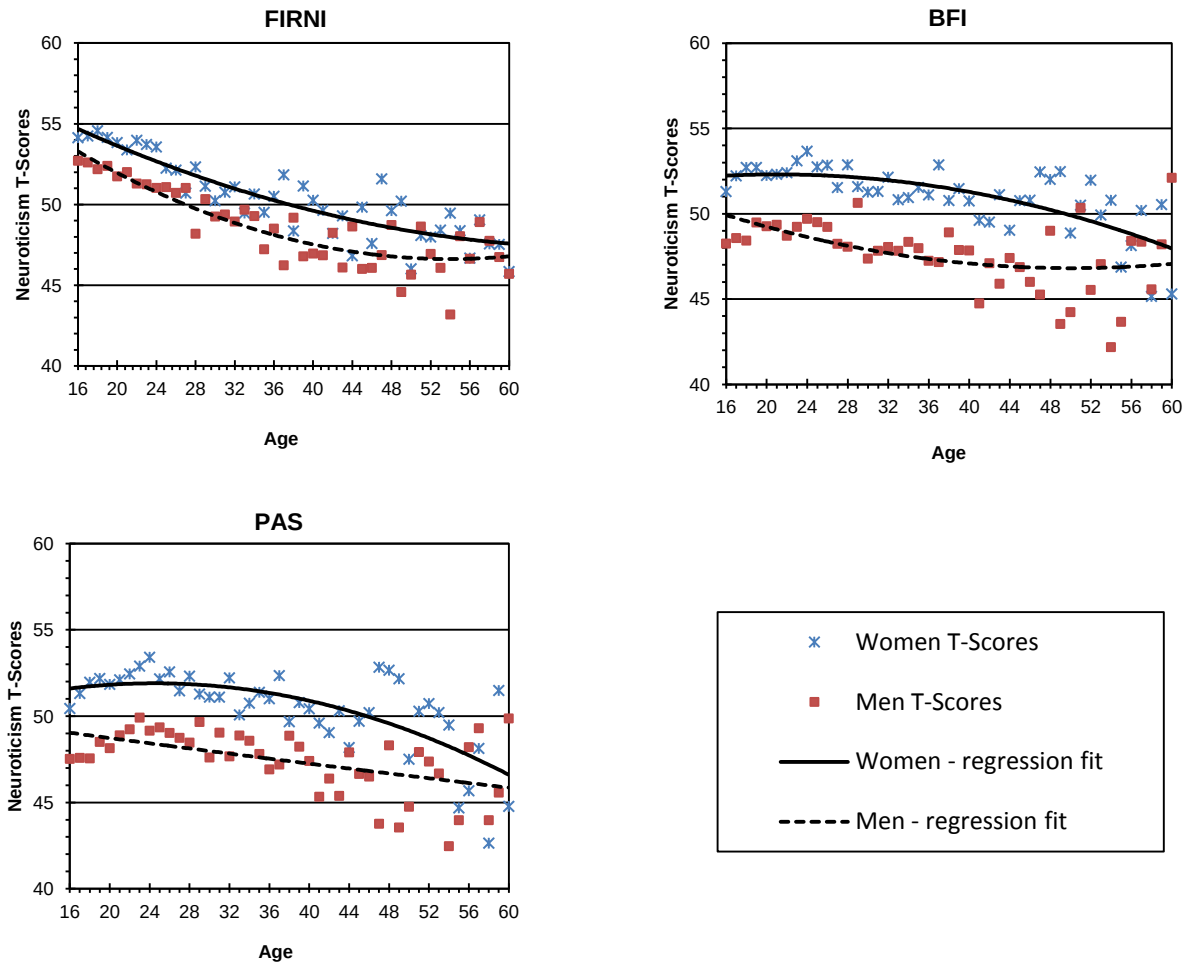

Figure 5.1 *T* scores for neuroticism broken down by age and gender, with fit curves from the regression models (see Table 1)

Extraversion. For extraversion, our model selection criteria resulted in a quadratic model that best described the data. This model along with the observed extraversion mean *T* scores is graphed in Figure 2. Results of the regression analysis indicated a negative association of extraversion with age in younger ages and a slight positive association in late middle adulthood. Comparing the mean *T* scores of the five age groups, it only reflects the negative association of Extraversion with age such that the youngest group scored highest and the oldest group scored lowest. However, the difference was relatively small (3.27 *T* units). These findings did not correspond with our hypothesis, which predicted a slight positive association of extraversion with age during adolescence. Regarding gender differences, women were consistently more extraverted than men. None of the age terms interacted with gender, suggesting that men and women did not show different age-related cross-sectional differences in extraversion.

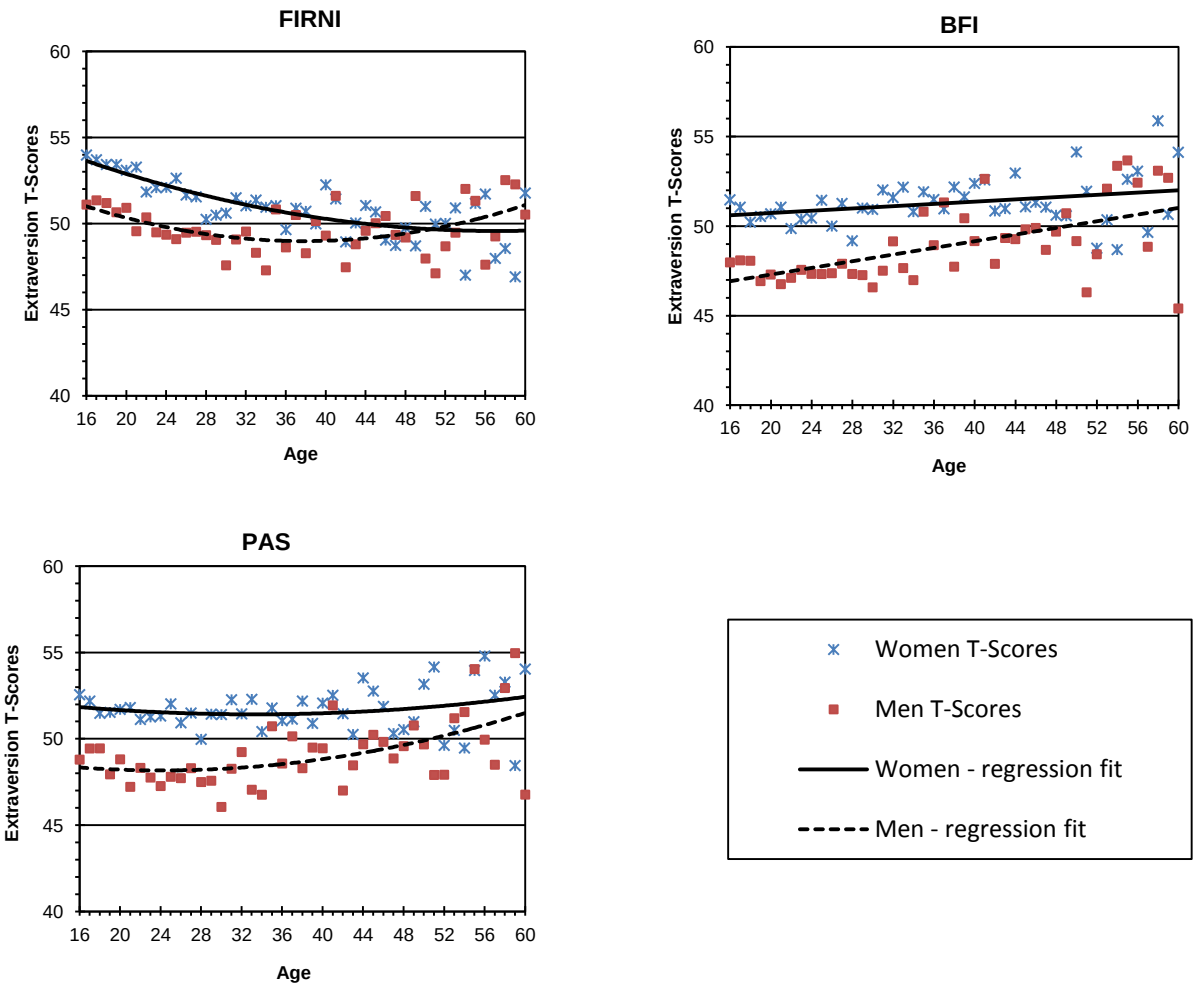

Figure 5.2 *T* scores for extraversion broken down by age and gender, with fit curves from the regression models (see Table 1)

Openness to experience. Of all five motivational manifestations of the Big Five, the largest age and gender effect were found for openness to experience. Data provided support for a quadratic model. The sample means and the quadratic fit line are plotted in Figure 3. Men and women showed a substantial positive association of openness with age throughout adolescence and younger adulthood, whereas individuals showed a negative association during late middle adulthood. The mean *T* scores of the five age groups demonstrate the positive association with age such that the youngest scores the lowest and the oldest group score the highest (a difference of 6.32 *T* units). However, the largest difference was found between the two youngest age groups (3.69 *T* units) while the three oldest age groups did not much differ (0.93 *T* units between the 30- to 39-years-olds and the 50- to 59-years olds). In line with our hypothesis, men were consistently higher in openness than women across the lifespan. Men and women did not differ in terms of the strength of the association of openness and age.

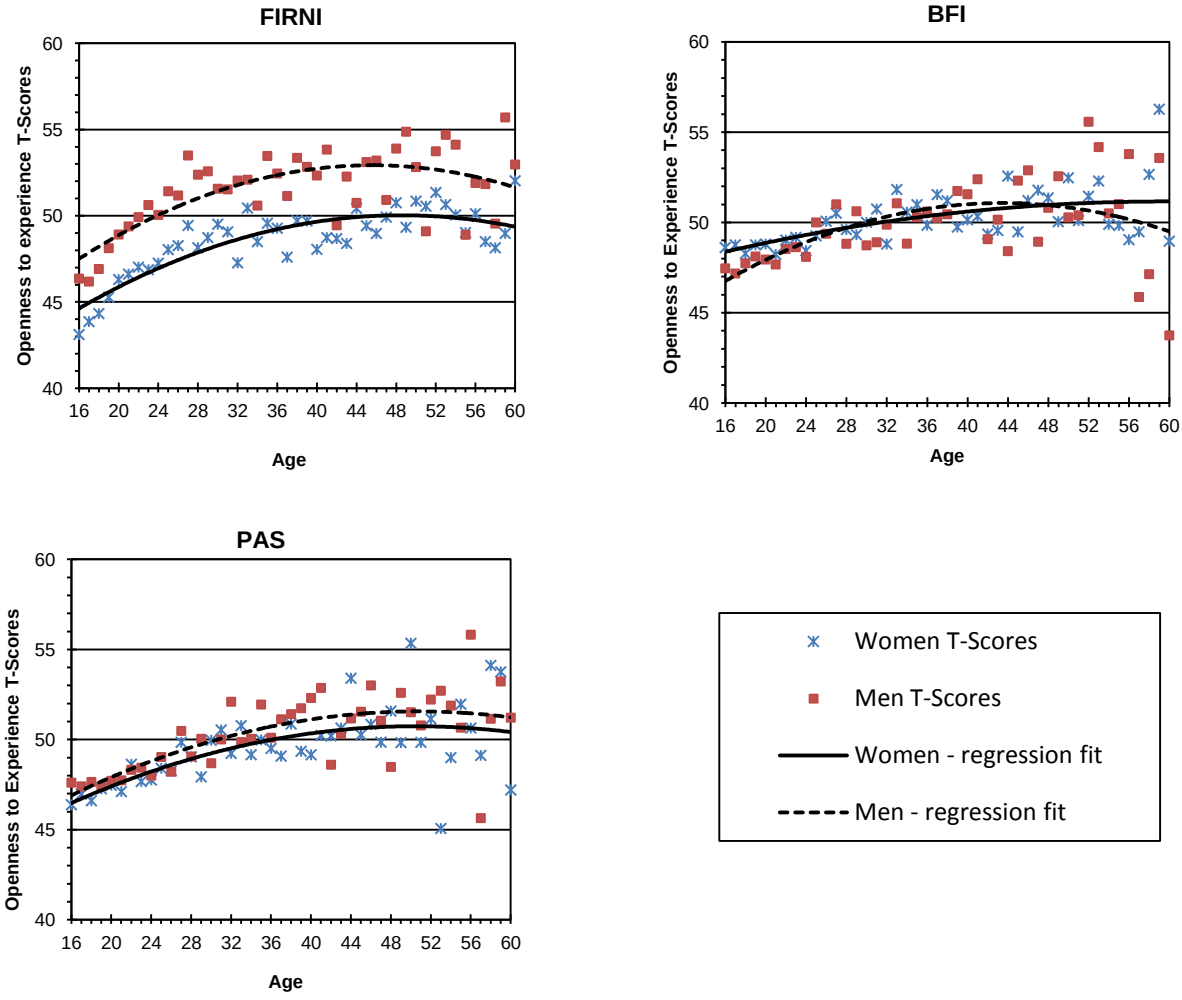

Figure 5.3 *T* scores for openness to experience broken down by age and gender, with fit curves from the regression models (see Table 1)

Agreeableness. For agreeableness, patterns of age differences were fairly linear (see Figure 4). A positive linear age trend is consistent with the notion that people slightly increase in agreeableness at all ages. This result is consistent with previous developmental findings (see Roberts et al., 2006). In the present study, however, agreeableness showed the smallest age effect of all five motivational manifestations of the Big Five (difference of 1.53 *T* units between the youngest and the oldest age group). In contrast, agreeableness showed a relatively strong gender difference. Women were higher in agreeableness than men throughout adolescence and adulthood. We did not find an interaction of age and gender.

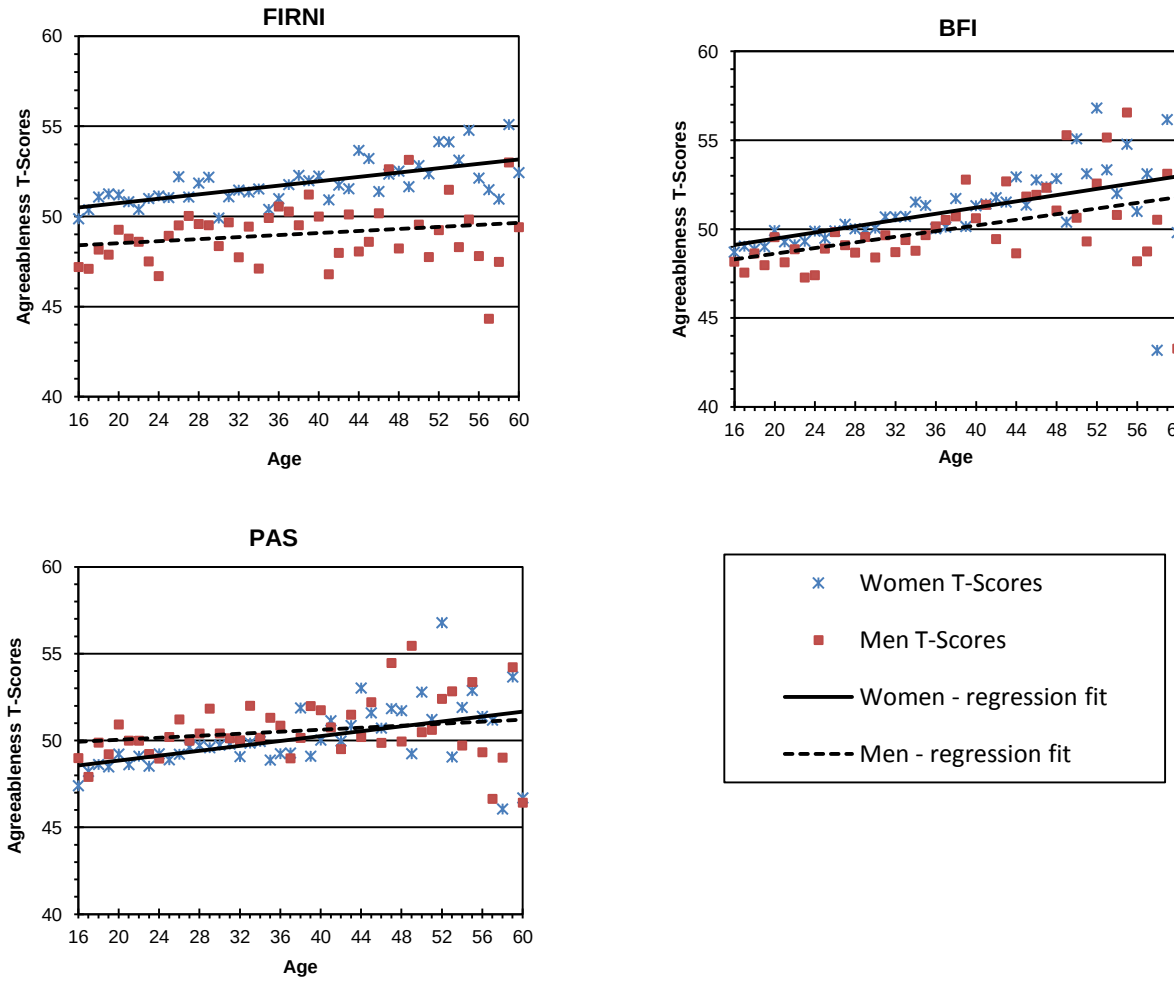

Figure 5.4 *T* scores for agreeableness broken down by age and gender, with fit curves from the regression models (see Table 1)

Conscientiousness. Results of regression analysis indicated a positive association of age and conscientiousness from age 16 to 60. The sample means and the linear fit line are plotted in Figure 5. The close correspondence between the plotted function and the means from the *T* scores suggests that the linear function captures the normative trend quite well. The difference between the youngest group and the oldest group was medium-sized (5.95 *T* units). Consistent with our hypothesis, the findings did not indicate a gender difference in this trait, nor did we find gender differences in the age correlates for conscientiousness.

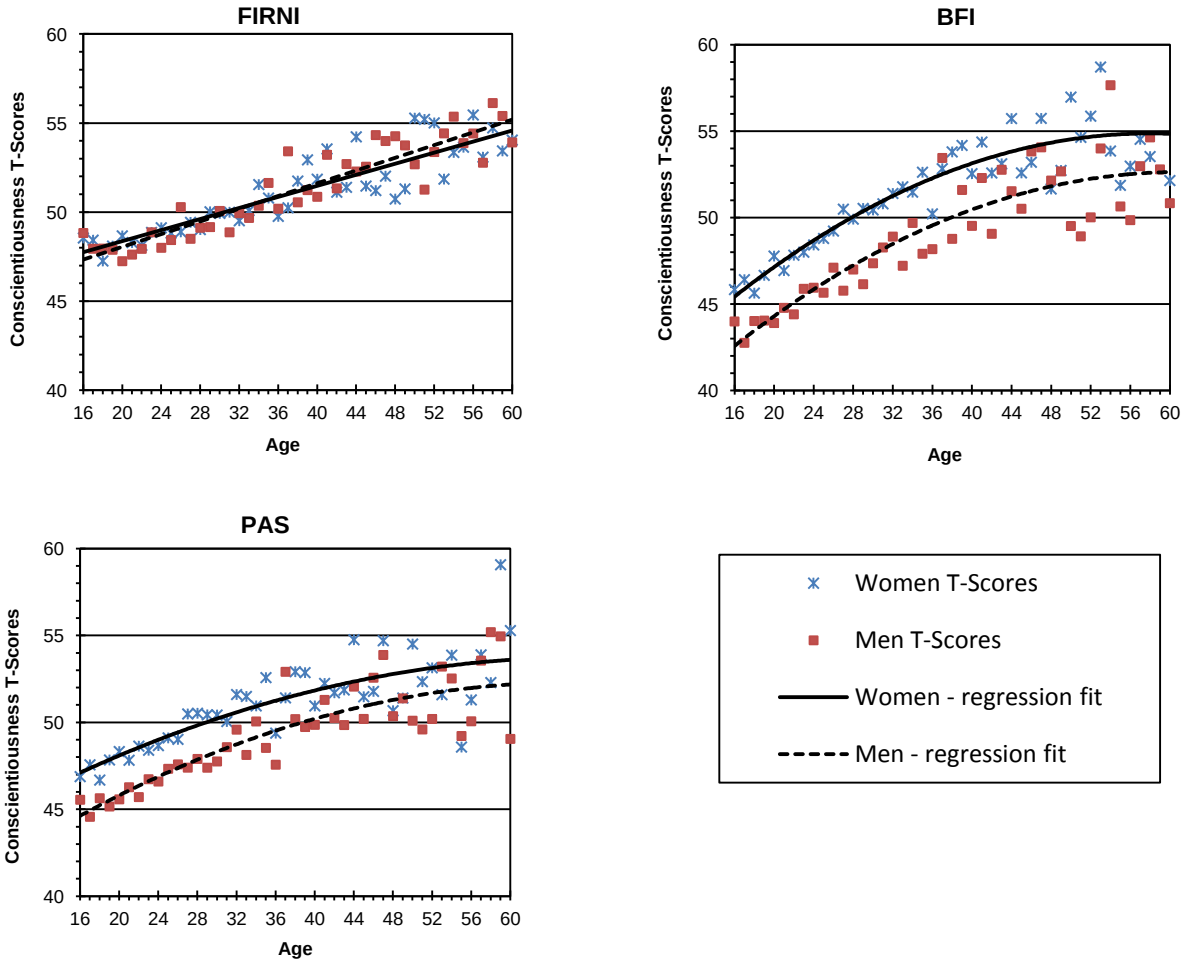

Figure 5.5 *T* scores for conscientiousness broken down by age and gender, with fit curves from the regression models (see Table 1)

A Multi-Measure Comparison of Age and Gender Differences in the Big Five

Descriptive statistics of the raw scores of the BFI and PAS are presented in Table 1. Results of the regression analyses are shown in Table 3. In Figures 1 to 5, regression curves of the age and gender patterns in the motivational manifestations of the Big Five are displayed alongside the age and gender plots for the two traditional measures. Finally, correlations of the three personality measures, separately by age categories and gender, are illustrated in Table 2.

Altogether, many age and gender patterns were replicated across measures. However, an examination of Figures 1 to 5 also reveals some interesting differences. In the motivational FIRNI scale, individuals for instance showed a substantial negative association of neuroticism with age throughout adolescence and young adulthood. In the BFI and in the PAS, however, participants showed no association of neuroticism with age and a slight positive association, respectively, during younger ages and did not show a negative association until middle adulthood. Differences between the motivational manifestations and the traditional measures could be detected for extraversion as well. Specifically, a significant age by gender interaction in the BFI revealed that men showed a stronger positive association of extraversion with age compared to women across the lifespan, whereas in the motivational manifestations men and women did not differ in terms of the strength of the association: They showed a negative association of extraversion with age during younger ages, and a slight positive association in later middle adulthood. Regarding openness to experience, age differences were much more pronounced in the motivational manifestations (6.46 *T* units between the highest and lowest scoring group) than in the traditional measures (PAS: 4.44 *T* units; BFI: 2.53 *T* units). Differences in gender patterns between the motivational manifestations and the traditional measures were most pronounced in agreeableness, with women being consistently more motivated to act in a cooperative way than men in situations of resource conflicts (i.e., the FIRNI conceptualization), whereas no strong and corresponding gender difference was found for the other two traditional measures (in fact, young men were slightly higher in agreeableness than women in terms of the PAS). Finally, men and women did not differ in the motivational manifestations of conscientiousness while in the traditional measures women were consistently more conscientious than men.

Table 5.3 Correlations of the Three Personality Scales, by Age Categories and Gender

	Age 16 – 19		Age 20 – 29		Age 30 – 39		Age 40 – 49		Age 50 – 60	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
Neuroticism										
FIRNI - BFI	.60	.59	.62	.64	.64	.66	.58	.64	.49	.64
FIRNI - PAS	.63	.62	.64	.67	.66	.69	.62	.63	.51	.64
BFI - PAS	.83	.83	.87	.87	.88	.89	.87	.90	.85	.88
Extraversion										
FIRNI - BFI	.77	.76	.76	.79	.74	.75	.74	.80	.74	.83
FIRNI - PAS	.84	.83	.82	.85	.80	.81	.77	.83	.77	.86
BFI - PAS	.88	.87	.88	.90	.87	.88	.86	.88	.81	.89
Openness										
FIRNI - BFI	.61	.60	.59	.59	.61	.60	.63	.64	.58	.68
FIRNI - PAS	.50	.56	.50	.51	.49	.58	.56	.59	.61	.63
BFI - PAS	.64	.69	.68	.67	.67	.71	.69	.70	.67	.78
Agreeableness										
FIRNI - BFI	.59	.62	.53	.58	.48	.55	.45	.54	.65	.60
FIRNI - PAS	.61	.68	.55	.64	.51	.61	.48	.52	.59	.60
BFI - PAS	.77	.79	.76	.76	.74	.76	.73	.71	.75	.77
Conscientiousness										
FIRNI - BFI	.71	.71	.74	.74	.69	.78	.69	.745	.53	.79
FIRNI - PAS	.51	.53	.55	.57	.47	.62	.47	.54	.35	.55
BFI - PAS	.79	.80	.82	.82	.81	.84	.77	.78	.73	.77

5.1.4 Discussion

The main objective of the present study was to investigate age and gender differences in the motivational manifestations of the Big Five in a large, cross-sectional Internet sample with an age span of 16 to 60 years. This was the first study to investigate age and gender patterns in the motivational manifestations of the Big Five as measured with the FIRNI. In addition, we compared these patterns with age and gender patterns of two established instruments that are based on items that tap into descriptive correlates of the Big Five.

Age and Gender Patterns in the Motivational Manifestations of the Big Five

With this article we complemented the motivational framework of the Big Five (Denissen & Penke, 2008a) by adding a developmental perspective. Specifically, we presented several socio-emotional and biological arguments to justify our hypotheses regarding age and gender differences in the motivational manifestations of the Big Five. Overall, the present findings are consistent with our hypotheses and replicated previous research that used traditional Big Five measures (e.g., Lucas & Donnellan, 2009; Roberts et al., 2006; Srivastava et al., 2003; Terracciano, McCrae, Brant, & Costa, 2005; Soto et al., 2011). Specifically, these authors found negative age associations with extraversion and neuroticism whereas they found agreeableness and conscientiousness to be positively related to age. Our results based on the FIRNI are also largely consistent with longitudinal findings showing that openness increases in late adolescence and young adulthood and decreases in late middle and older adulthood (cf. Roberts et al., 2006). Finally, we found that the negative association of FIRNI neuroticism with age gets weaker or even disappears in late middle adulthood. Although this pattern was not found in other studies, a recent study by Lehmann, Allemand, Zimprich, and Martin (2010) reported a similar increase in neuroticism in late midlife for a German sample.

Consistent with theoretical considerations and previous research, the positive association of agreeableness and conscientiousness with age and the negative association of neuroticism with age (except for late middle adulthood) can be interpreted as increasing maturity, in the sense of becoming emotionally more predictable and more attuned to social demands with age (e.g., Caspi, Roberts, & Shiner, 2005; Helson & Wink, 1987; Hogan & Roberts, 2004; Roberts et al., 2008). This pattern of age differences in personality reflects enhancing maturity across adulthood. It contributes to everyday life running smoothly and maintaining or increasing subjective well-being, life success, and longevity (e.g., Roberts & Wood, 2006). The positive association of conscientiousness with age, for example, may

reflect a developmentally appropriate step from juvenile risk-proneness and impulsivity to planning and self-regulation, as required by normative life tasks in adulthood, like parenting and career development. Note that more pronounced age-related trends in the FIRNI do not contradict its evolutionary theoretical foundations: Evolutionary conceptualizations of personality embrace developmental trends as adaptive allocations of effort in age-specific life tasks (Penke, 2010). In the conscientiousness example, juvenile risk-taking may reflect an adaptive increase in mating efforts (taking risks to find, compete for and impress potential mating partners), whereas adult organized self-control may reflect an equally adaptive focus on providing for offspring and other kin. The evolutionary reaction norm perspective, on which the FIRNI is based, explicitly captures personality stability as well as adaptive (developmental) plasticity (Dingemanse et al., 2010; Nettle & Penke, 2010).

Overall, using the FIRNI we replicated previous findings regarding gender patterns in the Big Five traits (except conscientiousness, see below; Lucas & Donnellan, 2009; Schmitt et al., 2008; Srivastava et al., 2003). Specifically, women were generally more neurotic, extraverted, and agreeable but less open to experience than men. On the basis of a very large cross-cultural study, Lippa (2010) suggested that biological factors contribute to gender differences in personality. Because gender differences were consistent across 53 nations and tended not by moderated by cultural indices of gender equality in this study, Lippa assumed that socio-cultural factors play a negligible to small role in moderating gender differences. This assumption fits well with our theoretical rationale as most of our explanations for gender differences are based on the evolutionary principle of sexual selection (Buss, 1995). However, other studies (e.g., Costa et al., 2001; McCrae, Terracciano, & 78 Members of the Personality Profiles of Cultures Project, 2005; Schmitt et al., 2008) reported that gender differences were more pronounced in egalitarian societies. According to Schmitt et al. (2008), gender differences in personality are vulnerable to restraining environmental pressures. As a society becomes more prosperous and more egalitarian, heritable dispositional differences between men and women might be less constrained to develop and be perceived, resulting in a widening of the gap that exists between men and women in their personality trait ratings.

A Multi-Measure Comparison of Age and Gender Patterns in the Big Five

To extend our analysis we aimed to compare age and gender patterns in motivational conceptualizations of the Big Five traits with Big Five traits that have a descriptive background. As expected, similar age and gender patterns were found for all three. However, we also found distinct differences for the FIRNI that are consistent with its different theoretical conceptualization when compared to the two other measures. First, regarding age

patterns in personality, the largest difference across measures appeared in neuroticism. In the motivational manifestations of the Big Five as measured by the FIRNI, neuroticism was negative associated with age during adolescence and young adulthood, whereas there was no association or even a slightly negative relation in late middle adulthood. The opposite pattern was found for the PAS and the BFI, which indicated adolescents and young adults to be stable until middle adulthood and only started to decrease after that. The FIRNI conceptualization of neuroticism as sensitivity for social exclusion might account for the different age patterns, especially in adolescence and young adulthood (cf. Denissen & Penke, 2008a, b). Moreover, because correlates of neuroticism such as affect regulation and self-esteem tend to improve during late adolescence and young adulthood (John & Gross, 2004; Robins, Trzesniewski, Tracy, Gosling, & Potter, 2002; Steinberg, 2005), it might be speculated that the FIRNI is more sensitive for developmental impulses in neuroticism during this age period than the traditional Big Five measures.

Second, we found larger age differences in openness to experience in the motivational manifestations compared to the traditional Big Five. Higher openness scores in middle-aged adults as compared to adolescents and younger adults might reflect an increasing reward value of complex thought processes during this period. The positive association of openness to experience with age until relatively late in development (after which levels of openness drop again) could be due to an increasing level of self-efficacy regarding complex thought processes due to practice over time, which may be counteracted by problems faced due to cognitive aging during later phases of development.

Finally, regarding gender patterns, the most notable differences between measures were found for conscientiousness. While the findings in the traditional measures were consistent with previous work favoring women (cf. Lucas & Donnellan, 2009; Srivastava et al., 2003), men and women did not differ in conscientiousness in the motivational manifestations of the Big Five. The finding of no gender difference in the motivational manifestations might express the conceptualization of conscientiousness as attention control in goal pursuit in the FIRNI. Empirical results suggest that women and men do not differ in cognitive control (Garavan et al., 2006; Luszczynska et al., 2003), which might reflect the ubiquitous importance of cognitive control processes in goal achievement for both genders, regardless of gender differences in the content of these goals.

Overall, the use of the FIRNI seems to be associated with accentuated age trends in mean-level personality traits. These age and gender patterns are in accordance with socio-emotional and biological principles. This is a first indication that the FIRNI might be the

instrument of choice in developmental research, though more research on the motivational manifestations of the Big Five is needed to substantiate such claims.

Limitations

Data were collected using the Internet. One problem of online surveys could be that they produce age confounded sampling biases (Denissen, Neumann, & van Zalk, 2010). For example, younger users might represent a fairly broad group, whereas middle-aged Internet users might be a more select subset of the corresponding population. First, to test for possible self-selection effects in the present sample, we compared the variability for the constructs of interest in the youngest and the oldest age group. If our oldest participants were indeed self-selected on the basis of their personality traits, then the observed variability of scores on those traits would be largest in adolescence and emerging adulthood (where age-specific samples would be most representative) and smallest in late middle adulthood (where age-specific samples would be most self-selected) (see Soto et al., 2011). To identify such trends, we computed a ratio for each scale (separately for men and women) that indexed the standard deviations in late middle adulthood (ages 50 to 60) relative to the standard deviation in adolescence (ages 16 to 19). Ratios substantially smaller than 1.00 would indicate much less variability in the oldest age group compared to the youngest age group. However, the mean ratio across personality traits, gender and the three personality questionnaires was 0.93. This ratio is relatively close to 1.00 and therefore suggests that the present findings are not likely due to differential self-selection effects as these would lead to sample homogeneity in personality. Second, an age-confounded sampling bias would be supported if Internet usage is very dissimilar in the several age groups. However, survey research on Internet usage and age in Germany showed that 97% of the 16 to 24 years olds use the Internet at least once a week, which is not much higher than the 93% of the 25-44 years old age group or the 90% of the 45 to 64 years old group (German Federal Office of Statistics, 2009). The relatively similar Internet usage in different age groups is not consistent with the notion that the present findings are caused by age-confounded sampling.

Another concern regarding the design of our study is the cross-sectional nature of the data. Age differences found in our analyses might be due to cohort (i.e., birth year) effects rather than to developmental change (e.g., Mroczek & Spiro, 2003). However, research using cohort-sequential longitudinal data showed only very weak cohort differences in personality traits (Terracciano, McCrae, Brant, & Costa, 2005). In addition, Trzesniewski and Donnellan (2010) were using large samples of high-school seniors from 1976 to 2006 and found little evidence of meaningful cohort change in variables like egotism, self-enhancement,

individualism, self-esteem, locus of control, hopelessness, and loneliness. Moreover, McCrae et al. (1999) examined age differences in personality traits in Germany, Italy, Portugal, Croatia, and South Korea. They found similar patterns of age differences in each country, for both men and women. Because these nations differ substantially in culture and recent history, results also mitigated the claim that history and cohort effects play an important role for personality development (McCrae et al., 1999). This is not to say that cohort is unimportant to age differences in the Big Five traits. For example, in a meta-analysis Roberts et al. (2006) showed that younger cohorts increased more in terms of conscientiousness than did older cohorts. Because also longitudinal designs cannot fully disentangle age and historical effects, comparisons between cross-sectional and longitudinal studies across different cohorts likely provide the most insight into the age correlates of mean-level personality development. As previously noted, our cross-sectional findings converge with findings longitudinal research (Roberts et al., 2006; Terracciano et al., 2005).

Finally, it should be kept in mind that theorizing regarding the substantive nature of the Big Five and their developmental changes is still in its infancy. Although the FIRNI emphasizes motivational processes, individual differences in situational exposure and perceptions as well as individual abilities may also underlie personality variation. Of course, this issue is too fundamental to address in the current paper, but we hope that future research will help to disentangle the specific contributions of motivations and ability while also taking into account additional constructs such as situational features, perceptions and attributions.

Conclusions

Our findings contribute to the literature by showing specific age and gender patterns in the Big Five, with a specific focus on their motivational manifestations. In many cases we replicated previous research on age and gender differences in personality traits. However, consistent with the motivational conceptualization of the FIRNI we also found pronounced differences. The current study presents a broad theoretical rationale for age and gender differences in the motivational manifestations of the Big Five and first empirical evidence. Future studies on personality development should focus on the underlying socio-emotional and biological processes in motivational manifestations of the Big Five.

6. Study 4

6.1 Divorce Predicts Interindividual Differences in Personality Trait Development in Middle Adulthood[8]

6.1.1 Introduction

Divorce is a relatively frequent life event with manifold individual, social and societal consequences. Divorce rates are quite high in the United States (3.4 per 1,000 residents; National Center for Health Statistics, n.d.) as well as in Europe, however, with large cross-national differences. For example, in 2008, Germany had a divorce rate of 2.3 while Italy had a divorce rate of 0.9 per 1,000 residents (Eurostat Yearbook, 2010). Although the issue of divorce is not new in most countries, it is of increasing interest for research and praxis because of the manifold consequences associated with this life event. To date, previous studies focused on changes in well-being and health as potential consequences of divorce. However, little is known about the association of divorce with long-term personality trait development.

Divorce and Individual and Social Functioning

From a psychological perspective, divorce is considered a serious life event that burdens those involved (Mastekaasa, 1992). Especially in middle adulthood divorce is a significant event because family is often reported as the most important area in the life of middle-aged adults (American Association of Retired Persons, 2002). Divorce is a stressful life event, even when the marriage was unhappy and divorce was desired (Waite, Luo, & Lewin, 2009). Interpersonal conflicts, the uncertainty, the divorce negotiations, and residential changes are often extremely stressful during the course of the divorce. In addition to the idea that a divorce represents a temporary crisis, researchers made the claim that divorce is also a source of chronic strain that might have long-term consequences (Amato, 2010; D. R. Johnson & Wu, 2002; Waite et al., 2009). This perspective points to chronic stressors like lack of social support, economic hardship, extra child care responsibilities, and stressors associated with custody arrangements often occur in the lives of divorced individuals. Because of these stressors, divorce seems to have both negative short- and long-term consequences for many individuals.

[8] A similar version of this chapter will be published elsewhere (Lehmann, Allemand, Leist, & Hill, submitted)

First, emotional dispositional well-being tends to decline after a divorce across a range of dimensions of well-being (D. R. Johnson & Wu, 2002; Luhmann & Eid, 2009; Waite et al., 2009). While Hetherington and Kelly (2002) found a crisis period of two years, during which most divorced individuals showed a diminished well-being, other studies suggest that a significant part of the individuals show a strong decline in well-being after a divorce, which lasts for several years without re-adapting to baseline levels (D. R. Johnson & Wu, 2002; Waite et al., 2009). Second, it has been shown for general mental health (Wade & Pevalin, 2004) and more specifically for major depression (Bulloch, Williams, Lavorato, & Patten, 2009) that individuals who undergo divorce seem to have lower levels of functioning before the divorce and in addition they seem to decline in psychological functioning even more afterward. Third, physical health seems to be affected by divorce. Sbarra and Nietert (2009), for example, showed an increased mortality risk for divorced individuals over a forty-year period and this result held after adjusting for baseline health and demographic variables. Moreover, the longer the temporal distance to the divorce, the larger the mortality risk was, suggesting long-term and cumulative negative effects of divorce on physical health. Fourth, regarding economic well-being, for women divorce seem to be associated with difficulties in long-term wealth accumulation (Hilton & Anderson, 2009) and with a substantial loss of income (Gadalla, 2009) while men seem to have an increased risk of social decline and become unemployed (Kalmijn, 2005). Finally, divorce might be a source for chronic stress in parenting. Twin research indicates that parental divorce is associated with offspring psychopathology (D'Onofrio et al., 2005). Moreover, longitudinal studies found that the differences in mental health between offspring from divorced and non-divorced families become larger with the passage of time (Cherlin, Chase-Lansdale, & McRae, 1998). To conclude, the negative consequences after divorce seem to be manifold and extend to almost every life domain. From an individual differences perspective, however, it can be assumed that a divorce may also have positive consequences for some individuals. It is an open question, however, whether chronic stressors associated with divorce can predict long-term individual differences in personality trait development.

Personality Trait Development in Middle Adulthood

There is now a large and growing literature that documents that personality trait development in adulthood is characterized by both change and stability, depending on the perspective of change one considers (Roberts, Wood, & Caspi, 2008). For example, research has shown that personality traits demonstrate relative high levels of structural stability (Allemand, Zimprich, & Hendriks, 2008), and rank-order stability (Roberts & DelVecchio,

2000; Terracciano, Costa, & McCrae, 2006). At the same time, previous research demonstrated systematic age differences and age-related changes in the mean-levels of personality traits in adulthood (Donnellan & Lucas, 2008; Roberts, Walton, & Viechtbauer, 2006). The general picture that evinced from both cross-sectional and longitudinal research suggests that adults tend to increase in social desirable traits such as Agreeableness and Conscientiousness, and tend to decrease in Neuroticism. Openness to experience tends to increase in early adulthood but shows moderate decreases in old age. Results for Extraversion are less consistent (cf. Roberts et al., 2006).

In contrast to mean age trends in personality traits, previous research also demonstrated reliable individual-level change in adulthood (Bleidorn, Kandler, Riemann, Angleitner, & Spinath, 2009; Lehmann, Allemand, Zimprich, & Martin, 2010; Lüdtke, Trautwein, & Husemann, 2009; Mroczek & Spiro, 2003). These systematic deviations from the sample mean-levels suggest variability in the degree and direction of personality trait change (cf. Baltes, Reese, & Nesselroade, 1977). In this context, individual differences in development reflect the plurality and diversity in life experiences individuals can encounter throughout the lifespan. Specific life events such as divorce might lead to different personality trait trajectories for individuals.

Divorce and Personality Trait Development

To date, very few studies have specifically investigated long-term personality trait development in response to divorce (Costa, Herbst, McCrae, & Siegler, 2000; Roberts & Bogg, 2004; Roberts, Helson, & Klohnen, 2002). For example, Roberts and Bogg (2004) investigated long-term personality trait development in a sample of women across a 30-year period from age 21 to age 52. They found that divorce was associated with changes in social responsibility (a facet of Conscientiousness). Costa et al. (2000) examined personality development in a sample of middle-aged adults over 6 to 9 years. Life events generally had little influence on the levels of the traits. However, they found some effects with respect to marital status. Moreover, gender differences were evidenced for the impact of divorce on personality trait development. While divorced middle-aged women showed increases in Extraversion and Openness to experience, divorced men showed decreases in Conscientiousness. Although available research suggests some effects of divorce on personality trait development, the results are inconsistent across the few studies.

Two theoretical perspectives suggest mechanisms that would drive divorce to change personality traits in the long-term. First, according to the *critical life events perspective*, life events such as a divorce might lead to major changes in a person's life circumstances, self-

beliefs, and attitudes in a way that normal routines cannot be upheld. In this way, critical life events might trigger a person's development and serve as an impulse for change (cf. Filipp, 1992; Filipp, 2007). Changes accompanying the life event are not only situational challenges, but mainly take place within a person (Filipp & Aymanns, 2009). This is exemplified in discrepant self-beliefs or self-knowledge (e.g., "I am competent and powerful" versus "my marriage failed"). These challenges and constraints that are provoked by a critical life event necessitate adaptation processes and might result in changes in behavior, self-beliefs and attitudes. Consequently, and referring to a definition of personality traits as consistent patterns of thoughts, feelings, and behaviors (J. A. Johnson, 1997, p. 74), consistent changes in behavior, self-beliefs or attitudes should lead to gradual development of personality traits. For example, it can be assumed that a divorce triggers an individual's development in a way that they start to care more about themselves, which results in a decrease in Extraversion in the long-term.

Second, the *role continuity perspective* suggests that stable social roles promote personality trait stability (Roberts & Wood, 2006; Roberts et al., 2008). Divorce, however, is associated with changes in social roles and includes transitions to new social roles. For example, a divorce might lead to the role of a single parent. Consequently, changes in social roles might promote personality trait development. Specifically, new social roles come with a new set of expectations and demands. It might be that these expectations change behavior, self-beliefs, and attitudes, and therefore, lead to changes in personality traits (Roberts & Wood, 2006). For example, it could be assumed that the new role of the single parent comes with an increase in parental responsibilities. Single parents might feel overburdened by the workload what might result in a decrease in Conscientiousness in the long-term.

The Present Study

The first objective of this study was to investigate interindividual differences in personality trait development over 12 years. The second objective was to examine the role of divorce as a predictor of interindividual differences in long-term personality trait development in middle adulthood. To do so, we used a multilevel modeling framework (Singer & Willett, 2003). We analyzed the data on the trait factor level and on the item cluster level. Specifically, in addition to the Big Five personality traits we utilized the item cluster approach as suggested by Saucier (1998). For example, Conscientiousness can be further differentiated into the item clusters Orderliness, Goal-Striving, and Dependability (for details, see the method section). This approach allowed for a more detailed picture of personality

development. Finally, we tested several potential moderators of personality trait development after divorce.

This study aimed to add to the literature in many respects. First, this study examined the long-term development of the Big Five traits as well as the item clusters in response to divorce in middle-aged women and men by means of an interindividual differences in change approach. Regarding previous research, Costa et al. (2000) investigated whether divorce is critical for the development of personality traits and facets. However, they did not use an interindividual differences in change approach and instead only compared difference scores of individuals who got divorced with individuals who got married. Second, we used multilevel models with full information maximum likelihood estimations that allows for including all participants, even those individuals with data from one or two measurement occasions. For example, Costa et al. (2000) had to exclude all individuals without two measurement occasions which might have biased the results. Third, compared to the few previous studies we explicitly tested for potential moderator variables. Finally, we examined the predictive role of divorce with respect to all Big Five traits in a rather large sample of men and women as some previous studies used small and women only samples (Roberts et al., 2002; Roberts & Bogg, 2004) or focused on one of the Big Five traits (Roberts & Bogg, 2004). Consequently, the present study aimed to extend the small literature on the association between divorce and personality development.

Hypotheses and Moderators

Following previous research (e.g., Mroczek & Spiro, 2003; Roberts et al., 2008), we expected significant interindividual differences in the Big Five traits. Regarding the second objective and partly in line with previous research findings (Costa et al., 2000; Roberts & Bogg, 2004), we expected a negative association between divorce and Conscientiousness. Although previous work has demonstrated an increase in the mean-level of Conscientiousness in adulthood (Roberts et al., 2006), we expected a differential pattern of individual-level change for divorced adults. Based on the critical life event perspective (Filipp, 2007) we assumed a decrease in Conscientiousness as a result of changes in the life circumstances, self-beliefs and attitudes. For example, the divorce might lead to a lower propensity to follow socially prescribed norms and rules due to changes in attitudes toward traditional life paths such as marriage. Based on the role continuity perspective (Roberts & Wood, 1996) we assumed a decrease in Conscientiousness as a result of changes in social roles due to divorce. For example, the new role of a divorced adult might have demoralizing aspects especially if the divorced individual is a parent and parenting often gets more complicated after the

divorce. Such problems might include a decline in the standard of living, loss of social support due to changes in the social network, or decrease in children's well-being (Amato, 2010). In the long-term, the stresses and strains of being divorced might specifically have negative influences on Conscientiousness.

The existing literature with respect to the other Big Five traits shows mixed results. Given the lack of clear trends, we do not predict specific relationships between the remaining personality traits and divorce. With regard to the item cluster level, we view theses analysis as exploratory because there are no previous results about the association of divorce with the development of the item clusters. In general, we expect modest effect sizes of divorce on changes in personality at the trait factor and the cluster levels as many interindividual differences might be found in the quality of the previous marriage and in the divorce experiences itself. For example, Amato and Hohmann-Marriott (2007) found that individuals in seriously distressed marriages reported improvements in happiness following divorce while individuals in less distressed marriages reported decrements in happiness following divorce.

Regarding moderators of personality change after divorce, there is first initial evidence for differential effects of divorce on women and men (Costa et al., 2000). Second, socioeconomic factors such as high levels of social support, education, and income might act as a buffer following a divorce (Williams, 2003). Third, having children might also moderate the influence of divorce on individual functioning. Being a parent when experiencing a divorce can create additional strains that persist over the long haul (Amato, 2010). Many single mothers deal with the continuing strain of solo parenting while many single fathers deal with the continuing strain of trying to maintain positive parent-child relationships within the context of limited access arrangements. Finally, we also tested the moderating role of remarriage. D. R. Johnson and Wu (2002) found that the decline in psychological well-being following divorce did not improve until people remarried. Put together, we tested the following potential moderators of personality trait development: (1) Gender, (2) having children, (3) remarriage, (3) distance to the last divorce, (4) educational attainment, (5) satisfaction with friends, (6) household net income, and (7) satisfaction with the financial situation.

6.1.2 Method

Participants

We used data from the Interdisciplinary Study on Adult Development (ILSE; Martin, Grünendahl, & Martin, 2001). In ILSE, participants come from two cohorts, one

compromising individuals born before World War II and the other including individuals born shortly after the war (i.e., 1930-1932 vs. 1950-1952, respectively). The study started in 1994 (T1), followed by reassessments in 1998 (Time 2, T2) and in 2006 (Time 3, T3). Because the focus of the present study was on middle adulthood, we only included the younger age cohort.

The sample consisted of 705 middle-aged adults aged 42 to 46 years at the first measurement occasion. For the present study we excluded participants without data on marital status, information regarding divorce and children, resulting in 526 participants. To examine potential bias caused by non-response, we compared the participants of our final sample with the excluded participants. Participants who were included in this study did not differ with respect to gender and personality traits at T1 from participants who dropped out. Participants who dropped out were significantly less educated (M = 13.63, SD = 2.59) than the participants in the final sample (M = 14.11, SD = 2.51), F (1, 681) = 4.70, $p < .05$, Cohen's d = 0.19. However, the magnitude of this difference was small.

From the 526 participants, 315 (59.9%) had data from three occasions, 159 participants (30.2%) from two occasions, and 52 participants (9.9%) from one measurement occasion. One advantage of individual growth modeling is that it permits the use of individuals who do not have data on all measurement occasions (Singer & Willett, 2003). Therefore, we were able to include many more participants in our analysis. Furthermore, we did not have to deal with the problem of attrition at measurement occasion T2 and T3.

One hundred and forty three (27.2%) participants experienced at least one divorce in the past (M = 1.18, SD = 0.5, Md = 1.0, range 1-4). Of the divorced participants, 76 (53.1%) were female, whereas 177 (46.2%) of the non-divorced participants were female, χ^2 (1) = 2.01, *ns*. The divorced participants had a slightly lower mean level of education (M = 13.7 years, SD = 2.3) than the non-divorced participants (M = 14.3, SD = 2.6), F (1, 518) = 7.27, $p < .05$, d = 0.24. Divorced participants (M = 3,500 DM (Deutsche Mark), SD = 2.6) also differed from the non-divorced with respect to household net income at T1 (M = 4,100 DM, SD = 2.1), F (1, 524) = 24.87, $p < .001$, d = 0.47. The magnitude of this difference is medium-sized effect. This group difference was also evidenced with respect to satisfaction with the financial situation at T1 as measured with a single item ranging from 1 (*very dissatisfied*) to 5 (*very satisfied*). Divorced participants were less satisfied with their financial situation (M = 3.42, SD = 1.11) than non-divorced participants (M = 3.66, SD = 1.00), F (1, 524) = 5.35, $p < .05$, d = 0.23. Regarding remarriage at T1, 61 (42.7 %) of the divorced participants were remarried and 130 (90.9%) had children while 325 (84.9%) of the non-divorced had children, χ^2 (1) = 3.27, *ns*. The mean distance from T1 to the last divorce was 12.75 years (SD = 6.12).

Divorced participants (M = 3.98, SD = 0.84) did not significantly differ from non-divorced at T1 (M = 3.92, SD = .67) regarding satisfaction with friends as indicated on a scale ranging from 1 (*very dissatisfied*) to 5 (*very satisfied*), F (1, 524) = 0.78, *ns*.

Measures

The data had a multilevel structure with measurement occasions (Level 1) nested within individuals (Level 2).

Level 1 variables. The Big Five personality traits Neuroticism, Extraversion, Openness to experience, Agreeableness and Conscientiousness were measured using the German Revised NEO Five-Factor Inventory (NEO-FFI; Borkenau & Ostendorf, 1993; Costa & McCrae, 1992). The NEO-FFI is a 60-item instrument designed to measure the Big Five personality factors, with each personality factor being assessed by 12 items. Participants were asked to respond on a 5-point Likert-type scale ranging from 0 (*strongly disagree*) to 4 (*strongly agree*). While the full version of the NEO-Personality Inventory Revised (NEO-PI-R; Costa & McCrae, 1992) divides the five personality factors into so-called facets, it is not possible to calculate facets in the NEO-FFI. However, Saucier (1998) demonstrated that most of the items of the NEO-FFI designated to measure the five personality traits fall into distinct, albeit related cluster subcomponents. These item clusters are somewhat similar, although not as specific as the facets of the full length NEO-PI-R.

The item clusters of Neuroticism are *Negative Affect* (feels inferior, worthless, helpless, ashamed) and *Self-Reproach* (worried, stressed, anxious, depressed). Extraversion has the item clusters *Positive Affect* (light-hearted, cheerful, optimistic), *Sociability* (gregarious, enjoys others, prefers company), and *Activity* (energetic, active, fast paced, action seeking). The items of Openness to experience fall into the clusters *Aesthetic Interests* (artistic, poetic, aesthetically sensitive), *Intellectual Interests* (abstract, philosophical, intellectual), and *Unconventionality* (nonconforming, free thinking, whimsical). Regarding Agreeableness, the item clusters *Nonantagonistic Orientation* (cooperative, trusting, amiable, conflict avoidant) and *Prosocial Orientation* (actively courteous and considerate, well-liked) can be identified. Finally, Conscientiousness has the item clusters *Orderliness* (methodical, neat, organized, efficient), *Goal-Striving* (goal-driven, hard working, motivated to excel), and *Dependability* (reliable, consistent, dependable). The number of items per cluster ranged from three to eight items. Given the relatively small number of items per cluster and the heterogeneity of the items, one would expect lower-than-average reliabilities for these scales. Moreover, these reliabilities are within the range of previous studies using the item cluster

(e.g., Chapman, 2007). Estimates of internal consistency (Cronbach's α) for all scales and measurement occasions are shown in Table 6.1.

Level 2 variables. As potential predictors of interindividual differences in personality trait development we included into the model whether, prior to the first assessment, the participant had experienced a divorce. Furthermore, the following variables were tested as moderators of change: Gender, children, remarriage, distance to the divorce, education, household net income, satisfaction with friends, and satisfaction with the financial situation.

Statistical Analysis

Data were analyzed with multilevel regression models using the software *Hierarchical linear and nonlinear modeling* (HLM; Version 6.08; Raudenbush, Bryk, & Congdon, 2005). In multilevel models, intraindividual change is modeled on Level 1 using time-varying variables (Singer & Willett, 2003). Interindividual differences in change are modeled by time-invariant variables on Level 2. Level 1 and Level 2 models were built stepwise and separately for each personality trait and each subcomponent. In Step 1, we modeled changes in personality in a simple model containing only Level 1 and no Level 2 variables. In Step 2, we extended the simple model by including the Level 2 predictor variable divorce to explain interindividual differences in the changes in personality. Furthermore, moderator and control variables were included stepwise into the model. Level 2 variables were retained if they improved the fit of the model according to the chi-square test of deviance at $p < .05$. For data analysis, all mean scores of the Big Five traits and item clusters were *z*-transformed (Singer & Willett, 2003). The variable time represents how many years have passed since the first measurement occasion: T1 was coded as 0, T2 as 4 and T3 as 12. All moderators were grand-mean centered (Singer & Willett, 2003).

To quantify the proportion of outcome variation explained by the extended models, we computed global pseudo-R^2statistics. According to Peugh (2010), effect sizes in multilevel model analysis are not as straightforward as in ANOVA or multiple regression analysis, and currently no consensus exists as to the effect sizes that are most appropriate. Definition of effect sizes is complex in the multilevel model for change because total outcome variation is partitioned into several variance components (Singer & Willett, 2003). In general, effect sizes tend to fall into two categories: Global and local (cf. Peugh, 2010). Global effect sizes quantify the variance in the response variable explained by all predictor variables in an analysis model, whereas local effect sizes quantify the effect of individual variables on the response variable. For this study, we focused on the pseudo-R^2 global effect size statistic that

can be computed in a similar way as the R^2 in multiple regressions (for details, see Peugh, 2010).

6.1.3 Results

Results are presented as follows: In a first step, baseline and growth models for the personality traits and the item clusters are described separately. The second step involves analyses about the influence of divorce on interindividual differences in personality trait development. Moreover, we report the results of the tested potential moderators of personality trait development. Means and standard deviations of the Big Five personality traits and the item clusters are displayed in Table 6.1 for all measurement occasions.

Interindividual Differences in Personality Trait Development

Prior to the analysis of any nested data one has to determine whether multilevel modeling is needed. To do so, we estimated the intraclass correlation coefficient (ICC) that reflects the amount of between- and within-person variance (Raudenbush & Bryk, 2002). For Neuroticism, the ICC is 0.63, implying that 63% of the total variation in Neuroticism is between-person variance (interindividual differences) and 37% is within-person variation (intraindividual variability). Regarding Extraversion, Openness to experience, Agreeableness, and Conscientiousness, 69%, 73%, 67%, and 67%, respectively, were between-person variances, and the remaining portion was within-person variances. Eventually, the item clusters showed between-person variance of 52% (Negative Affect), 63% (Self-Reproach), 65% (Positive Affect), 59% (Sociability), 62% (Activity), 60% (Aesthetic Interests), 65% (Intellectual Interests), 55% (Unconventionality), 63% (Nonantagonistic Orientation), 55% (Prosocial Orientation), 60% (Orderliness), 60% (Goal-Striving), and 56% (Dependability).

For the Big Five personality traits and the item clusters, Table 6.2 shows fixed and random effects estimates from models that allowed individuals to vary in both level and rate of personality trait change. Variance estimates of the intercept were significantly different from zero, reflecting individual differences in initial levels in all Big Five traits and item clusters. More importantly, variance estimates for the slopes were significantly different from zero for Extraversion, Openness to experience and Agreeableness, and for nine item clusters (see Table 6.2). This indicates significant variability among individuals in rate of change in the respective traits and item clusters. No significant individual differences in change were found for Neuroticism and Conscientiousness.

Table 6.1 Descriptive Statistics for the Big Five Personality Traits and Item Clusters

	T1 (1994)			T2 (1998)			T3 (2006)		
N	526			468			321		
Trait / Item Cluster (*N* Items)	*M*	*SD*	*α*	*M*	*SD*	*α*	*M*	*SD*	*α*
Neuroticism	1.47	0.58	.80	1.34	0.58	.84	1.42	0.62	.86
Negative Affect (5)	1.53	0.68	.58	1.36	0.68	.67	1.50	0.73	.74
Self-Reproach (7)	1.44	0.65	.78	1.33	0.62	.78	1.36	0.64	.80
Extraversion	2.38	0.48	.72	2.37	0.47	.73	2.31	0.49	.77
Positive Affect (4)	2.69	0.72	.77	2.73	0.69	.75	2.68	0.72	.82
Sociability (4)	2.38	0.61	.46	2.35	0.60	.52	2.31	0.61	.51
Activity (4)	2.07	0.62	.54	2.02	0.62	.57	1.95	0.60	.59
Openness to Experience	2.26	0.43	.59	2.24	0.44	.64	2.28	0.44	.66
Aesthetic Interests (3)	2.48	0.71	.54	2.50	0.70	.57	2.51	0.73	.69
Intellectual Interests (3)	2.50	0.73	.58	2.43	0.74	.59	2.53	0.75	.66
Unconventionality (4)	1.80	0.62	.28	1.80	0.59	.31	1.79	0.57	.37
Agreeableness	2.63	0.41	.63	2.65	0.41	.68	2.69	0.40	.69
Nonantagonistic Orientation (8)	2.47	0.46	.50	2.49	0.47	.58	2.54	0.45	.57
Prosocial Orientation (4)	2.96	0.50	.51	2.96	0.46	.51	2.99	0.47	.62
Conscientiousness	2.94	0.44	.76	2.93	0.44	.78	2.92	0.43	.76
Orderliness (5)	2.96	0.56	.62	2.97	0.55	.65	2.94	0.55	.67
Goal-Striving (3)	2.62	0.67	.61	2.59	0.68	.63	2.59	0.69	.67
Dependability(4)	3.15	0.49	.59	3.13	0.47	.60	3.14	0.46	.60

Note. The scales range from 0 to 4.

Table 6.2 Growth Curve Estimates for the Big Five Personality Traits and Item Clusters

	Fixed Effects Estimates (*SE*)		Random Effects Estimates (*SE*)				Model Test
Traits / Item Clusters	Intercept	Slope	Variance of Intercept	Variance of Slope	Covariance of I. and S.	Residual Variance	-2LL
Neuroticism	-0.00 (.04)	0.00 (.00)	0.66*** (.81)	0.00 (.02)	-0.00 (.00)	0.35 (.60)	3270.84
Negative Affect	-0.02 (.04)	0.00 (.00)	0.50*** (.71)	0.00 (.02)	-0.00 (.00)	0.45 (.67)	3396.55
Self-Reproach	-0.04 (.04)	0.01 (.00)	0.65*** (.80)	0.00** (.03)	-0.01 (.00)	0.33 (.58)	3260.40
Extraversion	0.01 (.04)	-0.00 (.00)	0.75*** (.87)	0.00*** (.04)	-0.01 (.00)	0.26 (.51)	3146.88
Positive Affect	0.01 (.04)	-0.00 (.00)	0.65*** (.80)	0.00** (.03)	-0.00 (.00)	0.30 (.55)	3175.98
Sociability	0.02 (.04)	-0.00 (.00)	0.59*** (.77)	0.00 (.02)	0.00 (.00)	0.40 (.63)	3349.52
Activity	0.00 (.04)	-0.00 (.00)	0.70*** (.83)	0.00*** (.05)	-0.01 (.00)	0.29 (.54)	3239.34
Openness	0.00 (.04)	-0.01 (.00)	0.77*** (.88)	0.00*** (.03)	-0.01 (.00)	0.23 (.48)	3036.01
Aesthetic Interests	0.01 (.04)	-0.00 (.00)	0.58*** (.76)	0.00* (.02)	-0.00 (.00)	0.37 (.61)	3298.10
Intellectual Interests	-0.00 (.04)	-0.00 (.00)	0.65*** (.81)	0.00 (.02)	-0.00 (.00)	0.34 (.58)	3243.30
Unconventionality	-0.03 (.04)	0.00 (.00)	0.60*** (.77)	0.00** (.04)	-0.01 (.00)	0.39 (.63)	3354.48
Agreeableness	0.01 (.04)	-0.00 (.00)	0.73*** (.85)	0.00*** (.04)	-0.01 (.00)	0.28 (.53)	3194.52
Nonantagonistic Or.	0.01 (.04)	-0.00 (.00)	0.67*** (.82)	0.00** (.03)	-0.01 (.00)	0.34 (.58)	3272.20
Prosocial Orientation	0.00 (.04)	0.00 (.00)	0.65*** (.80)	0.00*** (.04)	-0.01 (.01)	0.37 (.61)	3360.66
Conscientiousness	0.01 (.04)	0.00 (.00)	0.67*** (.82)	0.00 (.02)	0.00 (.00)	0.32 (.57)	3209.69
Orderliness	0.01 (.04)	0.00 (.00)	0.62*** (.79)	0.00** (.03)	-0.01 (.00)	0.35 (.60)	3279.12
Goal-Striving	0.01 (.04)	-0.00 (.00)	0.57*** (.76)	0.00 (.01)	0.00 (.00)	0.39 (.63)	3321.55
Dependability	-0.00 (.04)	0.00 (.00)	0.58*** (.76)	0.00*** (.04)	-0.01 (.00)	0.38 (.62)	3365.01

Notes. N = 526; the number of observations is 1315. Random slopes model with robust standard errors. Trait score were z-transformed before analyses. Standard errors are in parentheses. 2LL = -2 log likelihood, a fit index.
*p < .05, **p < .01, ***p < .001.

Table 6.3 Growth Models of Extraversion, Positive Affect, Orderliness, Dependability with Divorce

Effects	Estimate (*SE*)	*t* (*df*)	χ^2
Extraversion			
Fixed			
Intercept	0.01 (.04)	*t* (525) = 0.26	
Slope	0.00 (.00)	*t* (524) = 0.48	
Divorce × Slope	-0.02 (.01)	*t* (524) = -2.04*	
Random			
Variance of intercept	0.75 (.87)		2200.92***
Variance of slope	0.00 (.04)		633.73***
Covariance of intercept, slope	-0.01 (.00)		
Residual variance	0.26 (.51)		
Model summary			
-2LL	3141.47**		
Global pseudo-R^2	0.002		
Positive Affect			
Fixed			
Intercept	0.01 (.04)	*t* (525) = 0.15	
Slope	0.00 (.00)	*t* (524) = 1.15	
Divorce × Slope	-0.02 (.01)	*t* (525) = -2.63**	
Random			
Variance of intercept	0.64 (.80)		1755.40***
Variance of slope	0.00 (.03)		548.16**
Covariance of intercept, slope	-0.00 (.00)		
Residual variance	0.30 (.55)		
Model summary			
-2LL	3167.46*		
Global pseudo-R^2	0.003		
Orderliness			
Fixed			
Intercept	0.01 (0.04)	*t* (525) = 0.32	
Slope	0.00 (0.00)	*t* (523) = 1.35	
Divorce × Slope	-0.01 (0.01)	*t* (523) = -0.97	
Divorce × Remarried × Slope	-0.04 (.02)	*t* (523) = -2.28*	
Random			
Variance of intercept	0.62 (.79)		1546.46***
Variance of slope	0.00 (.03)		542.89*
Covariance of intercept, slope	-0.00 (.00)		
Residual variance	0.35 (.59)		
Model summary			
-2LL	3264.78**		
Global pseudo-R^2	0.002		
Dependability			
Fixed			
Intercept	0.05 (.05)	*t* (524) = 1.12	
Slope	0.01 (.01)	*t* (524) = 1.25	
Divorce	-0.19 (.09)	*t* (524) = -2.07*	
Divorce × Slope	-0.02 (.01)	*t* (524) = -2.07*	
Random			
Variance of intercept	0.57 (.76)		1305.79***
Variance of slope	0.00 (.04)		578.78**
Covariance of intercept, slope	-0.01 (.00)		
Residual variance	0.38 (.62)		
Model summary			
-2LL	3351.22*		
Global pseudo-R^2	0.012		

Notes. N = 526, the number of observations is 1315. Random slopes model with robust standard errors. Trait score were z-transformed before analyses. Standard errors are in parentheses. 2LL = -2 log likelihood, a fit index. *p < .05, **p < .01, ***p < .001.

Explaining Interindividual Differences in Personality Trait Development

In a next step, we examined whether divorce predicts interindividual differences in personality trait development when controlling for gender, children, remarriage, distance to the divorce, education, household net income, satisfaction with friends, and satisfaction with the financial situation. Figure 6.1 depicts the Extraversion trajectories for the non-divorced and the divorced individuals. Divorce did not predict interindividual differences in the initial level. However, divorce was a significant predictor of the rate of change of Extraversion (see Table 6.3). Individuals who experienced a divorce before the first measurement occasion tended to become less extraverted across the 12 year time period. In contrast, the non-divorced individuals seem to be more or less stable over time. None of the tested variables were significant moderators of the Extraversion trajectory. With respect to the item clusters of Extraversion we found a differential pattern. Positive Affect showed the patterns like Extraversion, whereas the two other item clusters did not (see Table 6.3). As shown in Figure 6.1, divorced individuals tended to decrease in Positive Affect whereas the non-divorced individuals were relatively stable. No significant moderators of change were found for the item clusters of Extraversion.

Divorce predicted interindividual differences in the rate of change in Conscientiousness, but not in the initial level. While divorced individuals seemed to become less conscientious across the 12 years, the non-divorced individuals seemed to stay more or less stable. Unfortunately, results of the random slopes model indicated no significant variance in the slope of Conscientiousness (see Table 6.2). Therefore, this result with respect to the higher-order factor Conscientiousness has to be interpreted with caution. However, with respect to the lower-order item clusters Orderliness and Dependability we found significant variance in the slopes, implying significant variability in change. Regarding Orderliness, divorce predicted interindividual differences in the rate of change but not in the intercept (see Table 6.3). However, when including the variable remarriage into the model, *remarriage* predicted the rate of change in Orderliness more strongly than *divorce* alone. As shown in Table 6.3, individuals who experienced a divorce and a remarriage in the past significantly tended to become less orderly across 12 years. In contrast, non-divorced individuals and individuals who experienced a divorce but not a remarriage in the past, tended to be relatively stable in Orderliness (see Figure 6.1). Finally, divorce did predict interindividual differences in the intercept of Dependability (see Table 6.3). At the baseline, divorced individuals were lower in Dependability compared to non-divorced individuals. In addition, have experienced a divorce did predict interindividual differences in the development of Dependability across the

period of 12 years. While the divorced individuals in general seem to decline in Dependability, the non-divorced individuals seem to be relatively stable over time or slightly increase in this item cluster (see Figure 6.1).

Regarding the tested moderator variables, only remarriage was a significant moderator of personality change after divorce. Like shown above, remarriage moderated the change trajectory of the item cluster Orderliness.

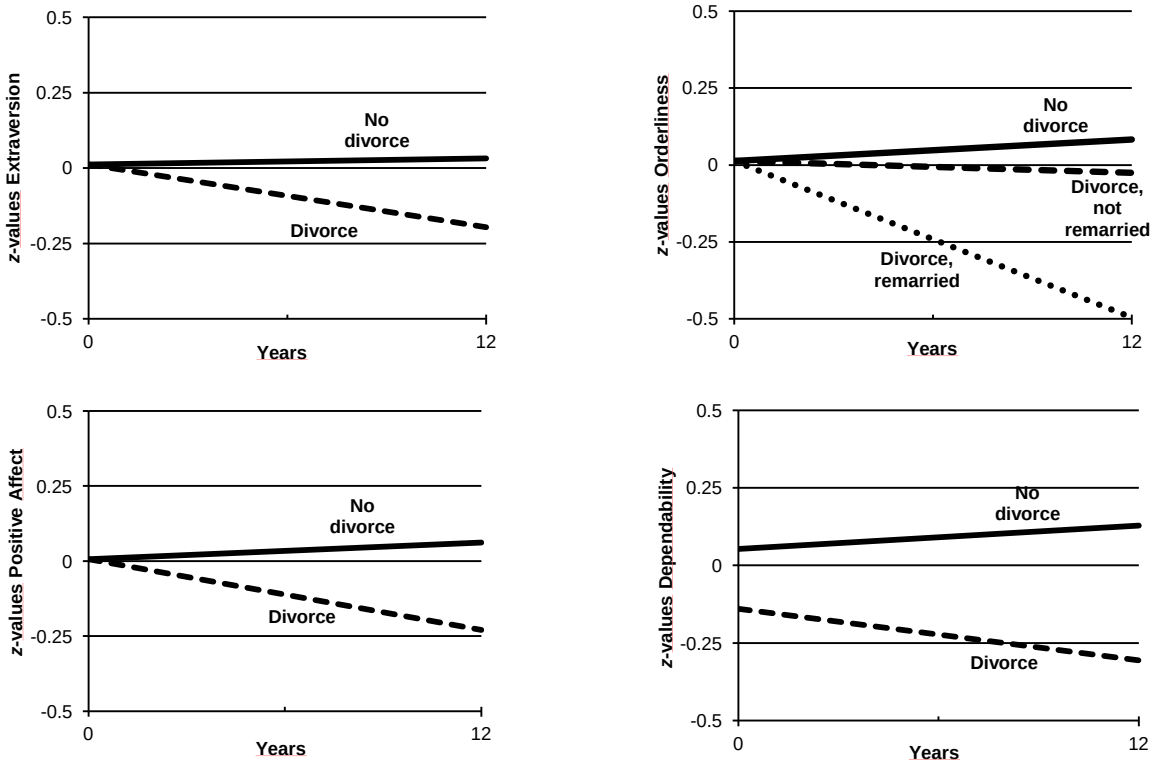

Figure 6.1 Growth models for the multilevel regression analysis of Extraversion, Positive Affect, Orderliness, and Dependability as a function of divorce

The effect sizes (i.e., global pseudo-R^2statistics; cf. Peugh, 2010) are depicted in Table 6.3. As an example, estimating the global pseudo-R^2 for Extraversion involves using the regression coefficients of the Growth model of Extraversion and divorce to obtain predicted Extraversion scores ($\hat{Y}_{ij}$) for each participant in the sample, as follows:

$\hat{Y}_{ij}$ = 0.01 + 0.00 (*Years*) – 0.02 (*Divorce*) (*Years*)

Next, the correlation between the observed and predicted Extraversion scores (i.e., *Yij* and $\hat{Y}_{ij}$, respectively) was r = .04 and squaring this value ($[.04]^2$ = .002) suggests that 0.2% of the total amount of variation in Extraversion can be explained by linear change and the interaction of linear change and divorce. The effect sizes for the other three significant models in terms of global pseudo-R^2 were as follows: The extended model for Positive Affect

explained 0.3% of the variance, the model for Orderliness 0.2%, and finally, the model for Dependability explained 1.2% of the total amount of variation (see Table 6.3).

6.1.4 Discussion

The present study examined the role of divorce for explaining interindividual differences in personality trait development in middle adulthood over 12 years. Three results stand out. First, our findings contribute to the literature by showing interindividual differences in the development of Extraversion, Openness to experience, and Agreeableness in middle adulthood and thus replicating previous research (Mrozcek & Spiro, 2003; Roberts et al., 2002). We did not find interindividual differences in change for Neuroticism and Conscientiousness, which implies that the middle-aged individuals in this sample developed rather homogeneously over the time period of 12 years with respect to the two traits. Similarly, Allemand, Gomez, and Jackson (2010) did not find individual differences in change in Conscientiousness in a sample of middle aged adults age 40-60 years over 10 years as well. Second, divorce seems to predict interindividual differences in the long-term development of Extraversion and of the item clusters Positive Affect, Dependability and Orderliness. Third, of all tested moderators of personality change after divorce only remarriage was significant. Specifically, divorce was associated with a decrease in Orderliness for individuals who were remarried.

Divorce and Personality Trait Development

Our results indicate that divorce in particular contributes to the explanation of interindividual differences in the development of Extraversion. Experiencing a divorce before the first measurement occasion was associated with a decrease in Extraversion over time. Importantly, this finding was independent of the distance to the divorce. Moreover, gender did not moderate the trajectory of Extraversion. The differential trajectory for Extraversion as a result of divorce may point to an underlying process by which stressful life events influence personality. The critical life events perspective suggests that challenges and constraints provoked by a life event like a divorce necessitates adaptation processes and might result in changes in behavior, self-beliefs and attitudes (Filipp, 2007). With respect to the decrease in Extraversion, it can be assumed that the challenges and constraints provoked by the divorce triggers a stronger focus on the inside world rather than on the world outside the self. Furthermore, event-related issues such as chronic stress due to single parenting absorb a lot of energy and might emphasize a stronger focus on oneself even more. It is possible that these changes are partly responsible for the decrease in Extraversion over time. The present

findings for Extraversion are partly consistent with other literature showing that some major life events and adverse life circumstances (e.g., long-term unemployment) might have long-term effects for subjective well-being (D. R. Johnson & Wu, 2002; Lucas, 2007; Waite et al., 2009).

The implications of a long-term decrease in Extraversion after divorce might be manifold. First, the decline in Extraversion might have an impact on social support because research indicates that being extraverted is positively associated with giving and receiving social support (Bowling, Beehr, & Swader, 2005). Given the importance of social support for reduced psychological distress (Ditzen et al., 2008) it is possible that this decline in Extraversion goes along with more psychological distress. Second, a decrease in Extraversion after a divorce might have implications for physical health outcomes such as higher blood pressure (Miller, Cohen, Rabin, Skoner, & Doyle, 1999) and greater susceptibility to colds (Cohen, Doyle, Turner, Alper, & Skoner, 2003a, 2003b). Future studies should test these possible health-related implications of a long-term decline in Extraversion.

Divorce did not predict interindividual differences in the development of Neuroticism, Openness to Experience, and Agreeableness. Although the variance in the slope of the Conscientiousness growth model was not significant, the multilevel analysis suggests an impact of divorce on the rate of change of Conscientiousness. Surprisingly, analyses showed no negative association of divorce and the development of Neuroticism. On the one hand, this finding may be due to a small mean-level increase in Neuroticism from T2 to T3. On the other hand, Neuroticism might not be sensitive for change after divorce in the long-term. Costa et al. (2000) did not find a long-term effect of divorce on Neuroticism as well. It is possible that some life events like divorce might differentially influence the Big Five personality traits, insofar that some traits might be more responsive to events in the longer term, whereas some traits might be affected in the shorter term. For example, it can be assumed that Neuroticism might not be systematically influenced over longer time period but instead is more responsive for temporary life circumstances and events and then readapt as a function of coping processes (e.g., Filipp, 2007). Taking together, the present results show an intriguing pattern for the two "affective" Big Five traits. While divorce did not influence Neuroticism in the long-term, it has an effect on Extraversion. It seems that divorced individuals were able to *down regulate* the negative feelings, thoughts and behaviors that are typically associated with a divorce in the short and intermediate-term (e.g., Hetherington & Kelly, 2002). However, they were not able to *up regulate* positive affect in the long-term. Future studies may test these ideas using specific measures of affective experiences.

Divorce and Personality Item Cluster Development

The results have shown that divorce significantly predicts interindividual differences in the development of several item clusters at the more fine-grained level. In particular divorce was associated with the rates of change of Positive Affect, Orderliness, and Dependability. First, individuals who experienced a divorce showed a decline in Positive Affect, an item cluster of Extraversion, across 12 years while the non-divorced individuals stayed more or less stable over this time period. The decrease in Positive Affect might be explained with regard to the role continuity perspective (Roberts & Wood, 2006). Divorce is associated with changes in social roles and includes transitions to new social roles like the role of the single parent (90.9% of the divorced individuals in our sample had children). Especially the social role of the single parent might come with a new set of expectations, strains and parental responsibilities. It can be assumed that the workload and specific strains (e.g., financial strains) are associated with fewer positive emotions and with a decrease in the amount of pleasant stimuli what in the long run might be associated with a decrease in trait Positive Affect. This finding might have implications for well-being outcomes. Evidence suggests an association of Positive Affect and lower morbidity, decreased symptoms and pain (Pressman & Cohen, 2005). In addition, King, Hicks, Krull, and Del Gaiso (2006) reported a significant association of Positive Affect and meaning in life. Therefore, a long-term decrease in trait Positive Affect after experiencing divorce might negatively influence the experience of life as meaningful. According to King et al. (2006), lives may be experienced as meaningful when they are felt to have significance beyond the trivial or momentary, to have purpose, or to have a coherence that transcends chaos.

Second, divorce predicted lower initial level and a long-term decrease in Dependability in individuals who experienced a divorce in the past. Dependability, an item cluster of Conscientiousness, is one of the most liked partner traits (Lippa, 2007). It is possible that during marriage Dependability was requested and promoted by the partner maybe through social control processes. In line with this argument, Tucker and Anders (2006) reported a positive association between social control and health behavior in married couples. Applied to Dependability and marriage, a greater feeling of obligation to the spouse and requests, reminders, threats and rewards from the spouse might have promoted reliable and dependable behaviors. The disappearance of this kind of social control after divorce might have brought along a decrease in Dependability in the divorced individuals in the long-term. The present finding is consistent with the research of Roberts and Bogg (2004) who found a decline in social responsibility in divorced individuals. Moreover, they reported that a decline

in social responsibility was related with higher tobacco and marijuana consumption. Therefore, change in Dependability possibly involves negative changes in health behavior. Finally, a long-term decrease in Dependability might also have negative consequences for mating success, as reliable and dependable behaviors are important in building new romantic relationships (e.g., Lippa, 2007). Mating success after divorce is beneficial to well-being (Sassler, 2010).

Third, divorce was associated with a decrease in Orderliness for individuals who were remarried. This finding is somewhat surprising. We would expect a positive influence of remarriage on personality trait development because a new partner is a source of social support. However, it can be assumed that individuals get untidier when they get remarried because they enjoy not being responsible alone for doing the housework anymore. Future studies are needed to test that assumption. Altogether, the results with respect to the item clusters of the Big Five illustrates the importance of analyzing personality trait development on a more fine-grained level such as item clusters or item facets (e.g., Terracciano, McCrae, Brant, & Costa, 2005). It is possible that item clusters are more responsive to life events and hence expectations in new social roles (e.g., single parent, remarriage) than traits at the broader factor level (McCrae et al., 2008).

Following previous research we expected gender to moderate personality trait development after a divorce (e.g., Costa et al., 2000). However, we did not find gender effects in the present study, which is in line with well-being research showing a similar effect of divorce on men and women's emotional well-being (Simon, 2002; Waite et al., 2009; Williams, 2003). Specifically, a decline in well-being in women and men was found, although the consequences for living conditions (e.g., women are more likely to have custody for their children than divorced men) and the type of emotional problems as reactions to the divorce (e.g., depressive symptoms in women versus increased alcohol consumption in men) might have differed by gender. Perhaps these results supports the notion that divorce is a source of chronic strain regardless what gender an individual belongs to.

As expected, the effect sizes were modest in magnitude. However, medium-sized to large effects are pretty unusual in personality developmental research (e.g., Lüdtke et al., 2009; Roberts, Walton, Bogg, & Caspi, 2006). More important, even small changes in personality might still have an impact on significant life outcomes as occupational success, longevity and health. For example, Mroczek and Spiro (2007) investigated the association between level and change of Neuroticism and mortality in older adults. They found that a

change in Neuroticism of about half a standard deviation over a decade increased the risk of dying by 40%.

Limitations

Some limitations of the present study have to be noted. First, one critique of the present study is the relatively long mean distance from the date of the divorce to the first measurement occasion. However, personality trait change is a rather slow process and the mechanisms that would drive life events such as a divorce to change personality traits most likely involve a continual environmental influence (Roberts et al., 2008). Moreover, we explicitly tested the potential moderating role of the distance to the divorce. Also important to consider is that negative consequences such as offspring psychopathology may not emerge immediately after the divorce but might be a rather slow and time-lagged process that gradually impact personality trait development of the divorced adult. This argument points to the importance of distinguishing between divorce as a stressful life event and divorce as a source of chronic strains for investigating the conceptual link between divorce and personality development. While stressful life events are discrete events with a clearly defined time course, chronic stressors are usually embedded in social roles (Strohschein, McDonough, Monette, & Shao, 2005). Second, for some of the item clusters we found lower than average reliabilities which might be due to low number of items and heterogeneous items in those respective item clusters. Finally, we cannot rule out the possibility decline in traits may result from selection effects. For example, our finding of decline in Extraversion may be because individuals who experienced divorced were already different from non-divorced individuals before the divorce and had developed differently anyway.

Conclusion

The present study provides support for the assumption that divorce can predict long-term interindividual differences in personality trait development. Furthermore, these results support the notion that critical life events such as divorce might be seen as a source of chronic strain. Chronic stressors associated with divorce may force changes in individual experiences and behaviors, and consequently in some aspects of personality. Indeed, our findings indicate that although personality traits are relatively stable over time, some of them are sensitive to life events in the long-term. Eventually, the results of this study also suggest that it is informative to extend the investigation of potential effects of life events to a more fine-grained level in order to better understand personality trait development.

7. General Discussion

In the first section of the following chapter the four studies (*chapters 3-6*) are discussed and their results are viewed in the context of the three research questions (*chapter 2*). For each of the research areas implications are stated, and consequences for future studies are discussed. Then, methodological considerations with respect to personality development research are illustrated. The third section of this chapter will give an outlook on a new research area in the field of personality development by describing the application of a relatively new methodological approach. The thesis ends with an overview on the most important findings of the present thesis.

7.1 Summary and Discussion of Study Results

7.1.1 There are Mean-Level Changes in Two Conceptualizations of the Big Five Traits across Middle Adulthood

The first aim of the present thesis was to review and empirically examine the nature and the amount of age differences and age-related changes in both traditional and motivational conceptualized Big Five traits across middle adulthood. This is important because several researchers (e.g., McCrae & Costa, 2000) characterized personality in the time-period of middle adulthood as rather stable while changes in social roles and specific life events would suggest personality trait change. First, the aim was met by reviewing theoretical and empirical work on personality stability and change in midlife (*chapter 3*). The investigation revealed that the lifespan development perspective exhibits a helpful theoretical background for the scientific study of personality development in middle adulthood. Specifically, the lifespan approach suggests stability and change of personality in middle adulthood because human development is a lifelong process and not completed at a specific age or life period. Furthermore, the review of empirical findings on mean-level change in personality traits revealed a mixture of different patterns of how people change with age. For example, Roberts, Walton, and Viechtbauer (2006) conducted an extensive meta-analysis and included 92 samples from longitudinal studies. Their results indicated that on average individuals became more socially dominant (a facet of extraversion), more conscientious and emotionally stable and less neurotic, respectively, through midlife. Other studies reported a positive association between agreeableness and age in adulthood. It seems that, on average, as people age they appear to get better at dealing with the ups and downs of life by becoming

more responsive, more caring, and more pleasant in social interactions, and also more forgiving.

Second, the first research question was analyzed with an empirical longitudinal study (*chapter* 4) using data from the Interdisciplinary Study on Adult Development (ILSE; M. Martin, Grünendahl, & P. Martin, 2001). Mean-level changes of personality traits were examined over a 12-year time period with three measurement occasions. The German sample consisted of 323 adults who initially ranged from 42 to 46 years of age. Personality traits were measured with the NEO-FFI Personality Inventory. Results indicated significant small-sized mean-level changes in neuroticism and extraversion. More specifically, individuals tended to decrease in neuroticism during the first measurement period, and tended to increase again in the second period. In contrast, analysis revealed a decline in extraversion across age. While the latter result is supported by some previous research (e.g., Donnellan & Lucas, 2008), the development of neuroticism is rather surprising. It can be speculated that the increase in neuroticism during the second measurement is associated with the economic situation on the labor market during the time of measurement in Germany. At the beginning of the third measurement occasion in the year of 2005, with 13% the unemployment rate reached its historic peak in the German post-war history (Bundesagentur für Arbeit, 2009). For adults older than the age of 50 this rate was even higher. Because older individuals are especially in danger to not finding new employment after job loss, the increase in neuroticism might be at least partly associated with the economic situation. This notion is supported by research showing an association of job loss and downturn in the labor market respectively and an increase in neuroticism (Costa, Herbst, McCrae, & Siegler, 2000; Scollon & Diener, 2006).

While study 1 and study 2 focused on traditional conceptualizations of the Big Five traits, study 3 (*chapter 5*) examined age differences in both traditional and motivational conceptualized Big Five. More specifically, age differences were investigated in the Big Five Inventory (BFI; John, Donahue, & Kentle, 1991), in the Personality Adjective Scale (PAS; Ostendorf, 1990), and in the Five Individual Reaction Norms Inventory (FIRNI; Denissen & Penke, 2008a) using cross-sectional data from a large German-speaking Internet sample (N = 19,022). These three Big Five questionnaires were all developed to tap into the same latent factor space of the five broad domains of personality. However, while the two traditional measures have a descriptive background, the Big Five traits in the FIRNI have a stronger theoretical base. More specifically, the relatively new FIRNI was developed to measure enduring individual differences in people's motivational reactions to circumscribed classes of environmental stimuli (Denissen & Penke, 2008a). For the motivational manifestations of the

Big Five traits, regression analysis suggested a decrease in neuroticism across midlife, stability in extraversion, openness to experience, and agreeableness, and finally, an increase in conscientiousness. Both the decrease in the motivational conceptualized neuroticism and increase in conscientiousness were supported by the findings in the BFI and the PAS.

Summary

Our findings do not support the notion that personality is stable after the age of 30. In contrast, a review and two empirical studies revealed mean-level changes in a motivational and in traditional conceptualization of the Big Five across midlife. These changes are by no means dramatic, but nonetheless show the applicability of the lifespan approach to personality development and that personality is not fixed at any age period. However, many findings from the two empirical studies are in contrast with each other. While the longitudinal study revealed a decline in extraversion and a U-shaped development of neuroticism, middle-aged adults in the cross-sectional study tended to decrease in neuroticism and to increase in conscientiousness.

Implications and Future Research

The results emphasize the plasticity of both traditional and motivational conceptualized Big Five traits across middle adulthood. Moreover, especially findings from study 3 implicate rather positive mean-level development in middle-aged adults with increasing emotional stability and conscientiousness. This is in line with the maturity principle suggesting adults becoming more functional and socially mature with age (Roberts, Wood, & Caspi, 2008). The inconsistency of the findings in the two empirical studies demonstrates the difficulty of research that examines personality development in detail in a very specific age period. In contrast, previous literature often described very general personality development trends for long periods of time not paying attention to deviations from the general trend in shorter periods. In the present thesis, the inconsistencies across studies might reflect different designs (longitudinal vs. cross-sectional), different personality measures, different sample selections (internet vs. traditional), different cohorts, or a combination of these factors. In sum, these reflections implicate further detailed research of mean-level trait development in the age period of midlife replicating the present findings across methods and samples.

7.1.2 There is Individual-Level Change in Personality Traits across Middle Adulthood

The first aim of the present thesis focused on personality development on the sample-level. Although it is important to investigate personality development on the mean-level, this

perspective also largely conceals individual differences in stability and change. Some individuals might be stable on a given trait, whilst others might change to varying degrees. Therefore, the second aim of this thesis was to examine the amount and nature of interindividual differences in personality development in middle adulthood. The aim was met by using two statistical approaches in two different empirical studies. In study 2 (*chapter 4*), using longitudinal data with tree measurement occasions of a sample of 323 middle-aged adults, individual-level development was examined with the reliable change index (RCI; Christensen & Mendoza, 1986; Jacobson & Truax, 1991). Specifically, the RCI allows determining the number of individuals with a significant amount of change versus the number of individuals that essentially stayed the same. The analysis revealed that 67.2% of middle-aged adults experienced at least one reliable personality change on at least one trait in one time period. All personality traits were characterized by larger proportions of changing individuals than would have been expected by chance. In neuroticism and extraversion the proportion of individuals showing increase as compared to decrease paralleled the observed mean-level trait changes. For instance, consistent with the mean-level decrease in neuroticism, 3.2 times as many individuals showed a reliable decrease as compared to an increase in neuroticism. In contrast, there was no evidence for an average change for openness, conscientiousness and agreeableness; however, a sizable portion of the sample both increased and decreased on these traits. For example, between the first and third measurement occasion 7.4% of the individuals reliably decreased and 6.8% reliably increased in conscientiousness.

To test for individual-level personality development in middle adulthood in study 4 (*chapter 6*), we used a multilevel modeling approach (Singer & Willett, 2003). In multilevel models, intraindividual change is modeled on Level 1 using time-varying variables. Interindividual differences in change are modeled by time-invariant variables on Level 2. Data were analyzed both on the trait factor level and on the item cluster level. Specifically, in addition to the Big Five personality traits we utilized the item cluster approach as suggested by Saucier (1998). Variance estimates of the intercept were significantly different from zero, reflecting individual differences in initial levels in all Big Five traits and item clusters. More importantly, variance estimates for the slopes were significantly different from zero for extraversion, openness to experience and agreeableness, and for nine item clusters. This indicates significant variability among individuals in the rate of change in the respective traits and item clusters. No significant individual differences in change were found for neuroticism and conscientiousness.

Summary

Two empirical studies have provided evidence for interindividual differences in level and change of both personality traits and item clusters across middle adulthood. Moreover, individual-level change was supported by two different statistical approaches. Surprisingly, study 4 revealed no interindividual differences in change in neuroticism and conscientiousness. This finding suggests a rather homogeneous development of the two traits across middle adulthood. In contrast, statistical analysis in study 2 suggested individual-level change in all of the Big Five traits. During one time period, on average, 41.9% of the middle-aged adults exhibited individual-level change in at least one personality trait.

Implications and Future Research

RCI and multilevel model analyses illustrate the concern that a singular focus on mean-level changes might obscure meaningful individual differences in personality trait change. To fully understand personality development across midlife it seems indispensable to analysis individual-level stability and change. Findings regarding individual-level change in the lower-order item clusters were diverse. Therefore, research on personality development should further acknowledge the hierarchical structure of personality and try to replicate the present item cluster findings. The heterogeneity of personality development found in most of the personality traits and item clusters might represent the diversity in the lives of the middle-aged adults (Lachman, 2004). Future research should address this and specifically analyze mechanisms behind deviations from the normative developmental trajectory across midlife. The next chapter will illustrate how the present thesis has examined processes behind individual-level trait change.

7.1.3 Divorce is Associated with Individual-Level Change in the Big Five across Middle Adulthood

While the first and second research question in the present thesis focused on the description of personality stability and change in middle adulthood, the third aim addresses the explanation of interindividual differences in personality development. More specifically, the thesis pursued the question if a specific non-normative life event such as a divorce is associated with individual-level personality change. This is important because there is still a lack of research on mechanisms behind personality change. A significant life event such as divorce might have the power to alter an individual's life and behavior patterns, and in the long-term might lead to trait change. Therefore, study 4 (*chapter 6*) examined the role of divorce on individual-level change in middle adulthood over the span of 12 years. Again, data

from the ILSE were used. The sample consisted of 526 middle-aged adults whereby 143 individuals had experienced a divorce in the past. Personality traits were measured with the NEO-FFI Personality Inventory at three measurement occasions. Then, we used multilevel models to examine whether divorce predicts interindividual differences in personality development when controlling for gender, children, remarriage, distance to the divorce, education, household net income, satisfaction with friends, and satisfaction with the financial situation. Three general findings were obtained: First, those individuals who experienced a divorce before the initial measurement occasion showed a decrease in extraversion and in its item cluster positive affect over time while the non-divorced individuals did not change on the respective trait or trait cluster. Second, divorce predicted a decrease in the trait cluster dependability. Third, divorce was associated with a decrease in orderliness for individuals who were remarried. This finding is somewhat surprising because we would expect a positive influence of remarriage on personality trait development.

Summary

Our findings revealed that a significant life event can predict interindividual differences in personality development in middle-aged adults. More specifically, divorce was associated with change in the trait extraversion and it the item clusters positive affect, dependability, and orderliness. Furthermore, remarriage was a significant moderator of change for orderliness. On the one hand, these results might support the notion that chronic stressors associated with divorce may force changes in individual experiences and behaviors, and consequently in some aspects of personality. On the other hand, the effects are rather small and also indicate a lot of stability in long-term personality development after divorce.

Implications and Future Research

The present findings suggest an association of divorce with personality trait change in middle adulthood. However, divorce predicted only for one of five traits and for three of thirteen item clusters interindividual differences in trait change and the effects sizes were relatively small. This leads to contrasting conclusions and implications for future research: First, the present results might suggest that personality is relatively resilient to the sheer occurrence of a divorce. This would be good news and would raise the question of how individuals manage to stay more or less the same after such a significant life event. Future research might examine specifically how divorced individuals stabilize their personality after such events. For example, structured interviews could be conducted to investigate how individuals have stabilized their personalities after having experienced a divorce.

Second, analysis of the general effect of the life event divorce on personality development might have concealed interindividual differences in personality development of divorced individuals. Specifically, it can be assumed that a divorce may also have positive consequences for some individuals. For example, previous research indicates that individuals who initiated divorce tend to be better adjusted in the post-divorce period compared to those who did not want the divorce (Wang & Amato, 2000). Furthermore, Sutin, Costa, Wethington, and Eaton (2010) suggested that not a life event itself, but rather the specific way in which the individual interprets the event is linked to personality development. Based on these arguments, future research should specifically examine interindividual differences in the effect of divorce on personality development. More specifically, future studies may investigate individual differences variables such as short-term and long-term cognitive processes, coping strategies, and processes of emotion regulation with respect to divorce and long-term personality development.

Third, findings might suggest that personality change associated with divorce occurred on lower levels rather than on higher levels of the personality hierarchy. It is possible that item clusters are more responsive to life events and hence expectations in new social roles (e.g., single parent, remarriage) than traits at the broader factor level (McCrae et al., 2008). Moreover, constructs on the lowest level of the hierarchy such as discrete behaviors, thoughts, and feelings might be even more sensitive for change when experiencing a divorce (Roberts & Pomerantz, 2004). Consequently, studies addressing the association of divorce with change in the lowest level of personality are needed in order to get a complete picture of long-term personality development after a significant life event such as divorce.

Finally, it has to be noted that medium-sized to large effects sizes are pretty unusual in personality developmental research (e.g., Lüdtke, Trautwein, & Husemann, 2009; Roberts, Walton, Bogg, & Caspi, 2006). More important, even small changes in personality might still have an impact on significant life outcomes such as occupational success, longevity, and health. For example, Mroczek and Spiro (2007) investigated the association between level and change of neuroticism and mortality in older adults. Analysis revealed that a change in neuroticism of about half a standard deviation over a decade increased the risk of dying by 40%.

7.2 Methodological Reconsiderations

Despite having multiple samples, and assessing them with multiple measures and diverse statistical methods, there were methodological limitations in the presented studies that should be considered in future research. First, because of the cross-sectional nature of the data

in study 3, age differences found in our analyses might be due to cohort (i.e., birth year) effects rather than to developmental change (e.g., Mroczek & Spiro, 2003). This proposition is supported by a meta-analysis showing a stronger increase in conscientiousness in younger cohorts compared to older cohorts (Roberts et al., 2006). However, there is evidence to suggest cross-sectional age differences in the present thesis reflect true developmental processes in middle adulthood and the findings would replicate longitudinally. For example, research using cohort-sequential longitudinal data showed only very weak cohort differences in personality traits (Terracciano, McCrae, Brant, & Costa, 2005). In addition, Trzesniewski and Donnellan (2010) were using large samples of high-school seniors from 1976 to 2006 and found little evidence of meaningful cohort change in variables like egotism, self-enhancement, individualism, self-esteem, locus of control, hopelessness, and loneliness. Moreover, McCrae et al. (1999) examined age differences in personality traits in Germany, Italy, Portugal, Croatia, and South Korea. They found similar patterns of age differences in each country, for both men and women. Because these nations differ substantially in culture and recent history, results also mitigated the claim that history and cohort effects play an important role for personality development (McCrae et al., 1999). Because also longitudinal effects are confounded by period effects, and furthermore are subject to selective dropout (people with certain trajectories may stop their participation) and testing effects (testing people repeatedly may change them), comparisons between cross-sectional and longitudinal studies across different cohorts likely provide the most insight into the age correlates of mean-level personality development.

A second methodological concern is that the internet recruitment in study 3 might have produced age-confounded sampling biases (Gosling, Vazire, Srivstava, & John, 2004). Younger Internet users might be a fairly broad group, whereas older internet users might be a more selective subset of older individuals. Srivastava, John, Gosling, and Potter (2003) have considered what age-related sampling biases would look like if they had occurred. They hypothesized that the internet may be less familiar to older individuals, and thus older individuals may have to be higher in openness in order to seek out and participate in an internet study. However, it is also important to take into account that study sampling can be biased in studies that recruited their sample with traditional methods (Denissen, Neumann, & van Zalk, 2010). There is always the risk that taking part in a psychological study or not might be characterized by individual-difference variables. This is just as true for "traditional" sampling methods, because it is hard to think of any demographic group that is equally likely to own a land-line phone, be at home when interviewers knock on their door, or answer a

mailing survey. Nevertheless, future studies using traditional samples are required to try to replicate the present internet findings. This is especially true for the age differences in the motivational conceptualized Big Five traits because in study 3 personality development in these relatively new conceptualization of the personality traits was examined for the first time.

A third methodological concern refers to the concept of measurement invariance (cf. Bollen, 1989; Meredith & Horn, 2001). Measurement invariance entails the degree to which a measure behaves equivalently across different groups or testing occasions. In the present thesis, indicators of a construct (e.g., neuroticism) were assumed to measure the "same thing" when used with different groups of individuals, or with the same individuals at different times. According to Meredith and Horn (2001), however, this assumption is not necessarily warranted; it is really a hypothesis that should be tested. A certain indicator stimuli can have a different meaning to different individuals and to the same individuals in different circumstances. Hence, as shown in some previous studies (e.g., Allemand, Zimprich, & Hertzog, 2007; Small, Hertzog, Hultsch, & Dixon, 2003), future research on personality development in middle adulthood should consequently evaluate measurement invariance. In a longitudinal study for instance, measurement invariance may be evaluated by examining invariance in factor loadings, latent intercepts, and residual variances by means of confirmatory factor analyses of personality questionnaires across measurement points (Allemand, Zimprich, & Hendriks, 2008).

A final methodological concern in the present thesis is that divorce effects in study 4 may result from social selection rather than from the life event itself. Specifically, one explanation for the differences in personality development of divorced individuals compared to non-divorced individuals is that married individuals with a certain personality are often inadequate marital partners and thus are more likely to be selected into divorce than individuals with different personalities (Amato, 2000; Johnson & Wu, 2002). Consequently, personality changes observed among the divorced in study 4 might be present early in the marriage or might even predate the marriage. Based on these arguments, future studies on the association of divorce and personality change should test for selection effects by analyzing multi-wave data of married individuals.

7.3 Outlook on a Application of the Idiographic Filter in Personality Development Research

In the last decade research on personality trait development more and more accounted for intra- and interindividual differences in personality stability and change. In the present

thesis, for example, three empirical studies have addressed these topics. However, idiosyncrasy on the measurement level of personality is still ignored in current personality development research. Nesselroade and his colleagues (2007, 2008) have recently formalized a method for the idiographic measurement of constructs among which the relations are invariant across individuals. The first section of this chapter gives a short overview of the theoretical basis of this idiographic filter approach. In the second section it is exemplarily shown how the idiographic filtering can help to bring idiosyncrasy into personality development research. The chapter ends with a summary and an outlook on future research questions related to bringing idiosyncrasy into personality development research.

7.3.1 Theoretical Background of the Idiographic Filter Approach

Nesselroade's proposed in 1970 that the same ability can be manifested in different forms depending on the individual, group, or stage of development. This idiographic approach emphasizes the uniqueness of the individual, whereas nomothetic concerns emphasize generality in behavioral lawfulness (e.g., Molenaar, 2004). Recently, Nesselroade, Gerstorf, Hardy, and Ram (2007) have formalized a rationale and method to answer the question of how one can acknowledge and deal with idiosyncrasy and still focus on generality in the quest to establish lawful relationships concerning behavioral development across the lifespan. The so called idiographic filter approach uses factor loadings as filters for idiosyncrasy while constraining the intercorrelations among the latent factors to invariance across individuals. More specifically, while holding the meaning of the higher-order factors (e.g., Big Five personality traits) constant, individuality in the manifest expression (e.g., items, behavior) of the factors is allowed. In a next step, the manifest expression of the higher-order factors can be compared between measures and across individuals and groups, respectively. What are objectively the same stimulus materials may not be interpreted the same way by different individuals, subgroups or across different stages of development and thus individuals, subgroups, and measurement occasions response differences respectively may be qualitative in nature rendering further comparisons questionable (Nesselroade & Estabrook, 2008).

Again, using this method provides an individually-tailored (filtered) set of relationships between observed variables and higher-order constructs with the latter having invariant properties across subgroups, individuals, or measurement occasions respectively (Nesselroade & Estabrook, 2008). This would mean, for instance, that the personality traits neuroticism and extraversion may be identified in a group with divorced individuals and in a group with non-divorced individuals. At the same time, neuroticism in the divorced group and neuroticism in the non-divorced group may not show the same pattern of loadings on the

observed variables (i.e., items) in other words, not the same behavioral manifestation (Nesselroade et al., 2007). Similarly, extraversion in the two groups may evince somewhat different loading patterns. Presumably, however, there will be sufficient resemblance that the substantive labels (neuroticism and extraversion) given the personality traits seem reasonable. But, using the higher-order invariance approach, the correlation between neuroticism and extraversion is specified to be precisely the same for the divorced and the non-divorced group. This line of reasoning is illustrated graphically in Figure 7.1 (Nesselroade et al., 2007). The figure portrays hypothetical R-technique factor solution for a group of divorced individuals and for a group of individuals who never have experienced a divorce. The loading patterns exhibit idiosyncrasies in that groups differ in which items (v1 to v9) define the respective higher-order factors neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. In contrast, the five factors intercorrelations (α to κ) are invariant across groups.

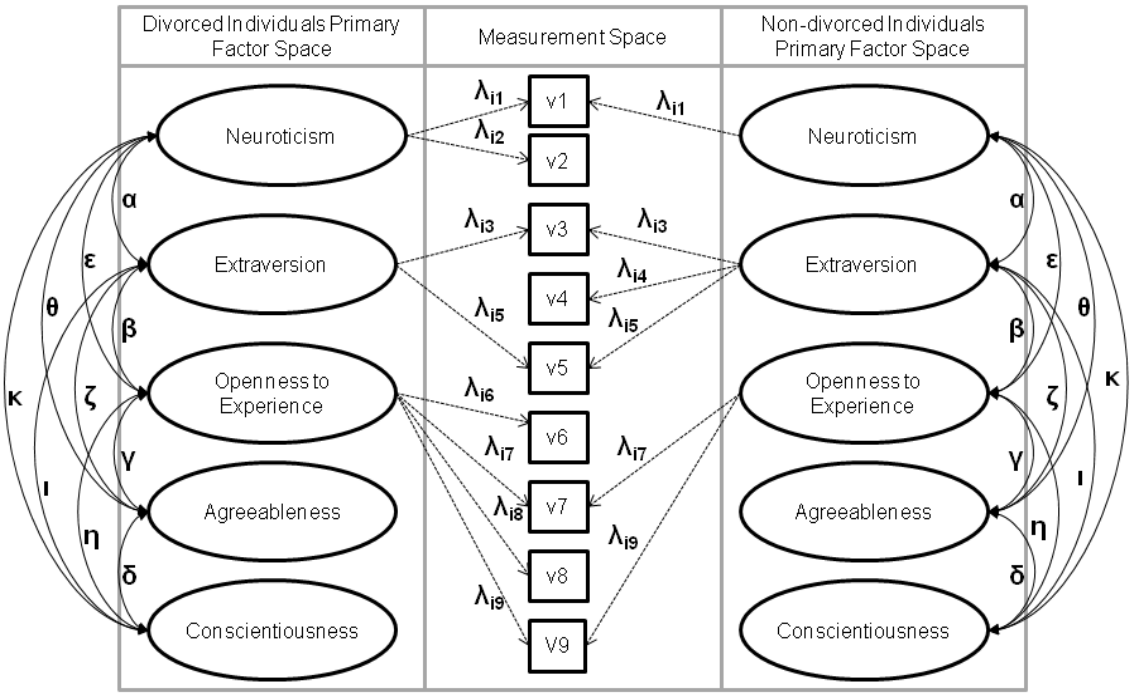

Figure 7.1 Graphical representation of an example for a factor solution for two marital status groups with invariance at the level of factor intercorrelations rather than factor loadings (after Nesselroade et al., 2007)

7.3.2 Example of Use: Behavioral Manifestation Differences across Time and Groups

To illustrate future application of the idiographic filter approach in personality development research, I describe two research questions that are related – contents wise – to study 4 of the present thesis. The first research question addresses if divorced and non-

divorced individuals differ in terms of the behavioral manifestation of the Big Five traits in the intercept and across time. Group differences in manifestations of certain variables were examined in previous research with respect to state-trait anxiety, depression, and neuroticism (Estabrook, Salthouse, & Nesselroade, 2009; Nesselroade & Estabrook, 2008). However, to the best of our knowledge, no study has ever addressed if a life event such as a divorce is associated with long-term changes in the behavioral manifestations of personality traits. It might be assumed that having experienced a divorce is related to several changes in the manifestations of the Big Five traits because challenges and constraints provoked by this significant life event necessitate adaptation processes. How such a change might look like will be illustrated by means of an example: In a certain personality inventory extraversion is measured by five self-descriptive adjectives (outgoing, friendly, lively, active, talkative). It can be speculated that individuals who experienced a divorce in the past show a long-term change in the behavioral manifestation of extraversion. While at the first measurement occasion extraversion might have manifested itself by how outgoing, friendly, lively, active, and talkative an individual was, at the second measurement occasion extraversion might no longer depend on the friendliness of an individual. In other words, being divorced was associated with a long-term change in the behavioral manifestation of extraversion.

With regard to the second research question, it might be of interest investigating if the magnitude of relations among the behavioral manifestations of the personality traits differs between divorced and non-divorced individuals and across time. To date, a similar question was examined with respect to cognitive abilities (Tucker-Drob & Salthouse, 2008), testing the differentiation-dedifferentiation hypothesis. Based on such cognitive aging research, it might be suggested that having experienced a divorce is associated with a dedifferentiation of personality. According to cognitive developmental theories (e.g., Baltes, Cornelius, Spiro, Nesselroade, & Willis, 1980; Cattell, 1987), maturation and learning supports ability proliferation during adolescence and young adulthood, whereby individual differences in cognitive abilities become less related to one another (i.e., more differentiated). In contrast, during development in older adulthood common constraints limit the expression of diverse abilities which brings along an age-related increase in relatedness (i.e., dedifferentiation) of cognitive abilities. Transferring cognitive developmental theory to personality might suggest that undergoing a divorce might limit the expression of personality in its diversity, and therefore relatedness of the personality traits behavioral manifestations might increase. For example, neuroticism might be measured by means of the adjectives moody, worrying, nervous, and calm. It can be speculated that divorce is associated with an increase in the

relatedness of behavioral manifestations of neuroticism across time. Consequently, divorced individuals neuroticism would be manifested in high moodiness, high nervousness, a high amount of worrying, and little calmness. In contrast, non-divorced individuals behavioral manifestation of neuroticism would be characterized by stability across time and hence, lower relatedness compared to divorced individuals. This would mean, for instance, that a non-divorced individual with a high level of neuroticism shows very low moodiness, high nervousness, a very high amount of worrying, and little calmness.

7.3.3 Summary and Further Research Questions

To summarize, the presented research questions characterize a way how to account for idiosyncrasy in personality development research. The hypotheses proposed in this chapter are very speculative and it is unclear how the results might actually look like. Still, the notion that constructs might be linked to different observable patterns depending on individual, age, or subgroup is important to examine. The measurement tools Nesselroade and his colleagues have created would be very useful to test the proposed hypotheses empirically. Furthermore, future studies might apply the idiographic filter approach also to other question and problems in personality development research. For example, future research might address Nesselroade and Estabrook's (2008) claim to tailor measurement frameworks for theoretically important constructs appropriately to different subgroups and occasions of measurement. More specifically, the idiographic filter approach would offer the possibility of measuring the same construct with different patterns of observable variables for different individuals or subgroups (e.g., age levels). This would be especially useful when the age range of one's sample of participant is very large because objectively the same stimulus materials may not be interpreted the same way by different age groups. Finally, pursuing such an approach would help supporting the idea of a differential developmental psychology.

7.4 Conclusion

The aim of the present thesis was to examine the nature of personality development in the age period of middle adulthood. This aim was met by reviewing theory and previous research (*chapter 3*) and by conducting three empirical studies (*chapter 4 to 6*). The thesis emphasized the idea of personality plasticity in middle adulthood. Reviewing theory and research on human and personality development literature made evident that concepts of the lifespan development perspective provide a theoretical background for thinking about personality development in middle adulthood. Specifically, this perspective considers development as a lifelong process, multidirectional, embedded in a context, and characterized

by individual differences. These concepts may offer insight into structures and processes of personality development in middle adulthood. Based on the first concept – development as a lifelong process – study 2 and study 3 investigated mean-level trait changes in midlife and revealed personality plasticity in two conceptualizations of the Big Five. However, analyses also demonstrated the complexity when examining personality development during a specific life period in detail because results were rather inconsistent. On the one hand, factors of study design such as sampling procedures or personality measures might explain at least some part of inconsistency. On the other hand, inconsistency in results might reflect the wide variability and nature of the midlife period. Middle adulthood is often characterized by pronounced interindividual variation of intraindividual development, thus questioning any attempt to seek uniformity in this life period (Wahl & Kruse, 2005). Based on these reflections, study 2 and study 3 further analyzed interindividual differences in personality stability and changes across midlife. Findings presented in this thesis support the notion of individual-level change. In study 2, for instance, 67% of middle-aged adults experienced at least one reliable trait change in one measurement occasion. This begs the question of how such individual-level changes might be provoked. Objectively significant life events such as a divorce might be seen as triggers for personality trait changes. This notion was supported by multilevel analyses in the present thesis. More specifically, findings suggested a long-term decrease in extraversion, positive affect, and dependability in individuals who experienced a divorce in the past. In addition, divorced individuals who remarried were characterized by a decline in orderliness across midlife.

All in all, the present findings support the notion that personality development across midlife is characterized by both mean-level and individual-level personality changes on higher and lower levels of personality hierarchy. Moreover, results suggested that a divorce is critical for personality trait change. However, there are still open questions regarding the nature of personality stability and change across middle adulthood. One open question deals with mechanisms of change other than a specific life event. For example, Caspi and Roberts (2001) assumed observational learning as a predictor for personality change. Future research should empirically examine if observing individuals such as mentors, coaches, or friends is related to personality change in middle-aged adults. In addition, future research might test stability promoting mechanisms empirically because trait changes across midlife are rather small even though most individuals experience significant life transitions. Finally, it would be highly informative for the understanding of the nature of personality development to analyze observer ratings. To date, there is especially a lack of knowledge about individual-level

change other than self-report (Watson & Humrichouse, 2006). Individual-level changes found in the current thesis may reflect subjective changes in personality rather than observable changes.

To conclude, the present thesis took a broad view on personality stability and change across middle adulthood. The results demonstrate that the nature of personality development can be explained more accurately when different levels of personality and different types of stability and change are explored using diverse statistical methods. In order to obtain an even more complete picture of personality development across midlife, future studies are needed in order to address the open questions mentioned in this thesis from a multimethod perspective.

8. References

Allemand, M. (2008). Age differences in forgivingness: The role of future time perspective. *Journal of Research in Personality, 42,* 1137-1147.

Allemand, M., Gomez, V., & Jackson, J. J. (2010). Personality trait development in midlife: Exploring the impact of psychological turning points. *European Journal of Ageing, 7,* 147-155.

Allemand, M., & Lehmann, R. (in press). Personality development and aging. In V. S. Ramachandran (Ed.), *Encyclopedia of Human Behaviour* (2nd ed.). San Diego (CA): Elsevier.

Allemand, M., Zimprich, D., & Hendriks, A. A. J. (2008). Age differences in five personality domains across the life span. *Developmental Psychology, 44,* 758-770.

Allemand, M., Zimprich, D., & Hertzog, C. (2007). Cross-sectional age differences and longitudinal age changes of personality in middle adulthood and old age. *Journal of Personality, 75,* 323-358.

Allemand, M., Zimprich, D., & Martin, M. (2008). Long-term correlated change in personality traits in old age. *Psychology and Aging, 23,* 545-557.

Allik, J., Laidra, K., Realo, A., & Pullmann, H. (2004). Personality development from 12 to 18 years of age: Changes in mean-levels and structure of traits. *European Journal of Personality, 18,* 445-462.

Allport, G. W., & Odbert, H. S. (1936). Trait-names: A psycho-lexical study. *Psychological Monographs, 47,* No.211.

Amato, P. (2010). Research on divorce: Continuing trends and new developments. *Journal of Marriage and Family, 72,* 650-666.

Amato, P. R., & Hohmann-Marriott, B. (2007). A comparison of high and low-distress marriages that end in divorce. *Journal of Marriage and Family, 69,* 621-638.

American Association of Retired Persons (2002). *Tracking study of the baby boomers in midlife.* Washington, DC: AARP.

Antonucci, T. C., Akiyama, H., & Merline, A. (2001). Dynamics of social relationships in midlife. In M. E. Lachman (Ed.), *Handbook of midlife development* (pp. 571-598). New York: Wiley.

Ardila, A. (2008). On the evolutionary origins of executive functions. *Brain and Cognition, 68,* 92-99.

Baltes, P. B. (1987). Theoretical propositions of lifespan developmental psychology: On the dynamics between growth and decline. *Developmental Psychology, 23,* 611-626.

Baltes, P. B., Cornelius, S. W., Spiro, A., Nesselroade, J. R., & Willis, S. L. (1980). Integration versus differentiation of fluid/ crystallized intelligence in old age. *Developmental Psychology, 6,* 625-635.

Baltes, P. B., Lindenberger, U., & Staudinger, U. M. (2006). Lifespan theory in developmental psychology. In W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (6th ed., pp. 569-664). New York: Wiley.

Baltes, P. B. Reese, H. W., & Nesselroade, J. R. (1977). *Lifespan developmental psychology: Introduction to research methods.* Monterey ,CA: Brooks-Cole.

Baltes, P. B., Staudinger, U. M., & Lindenberger, U. (1999). Lifespan psychology: Theory and application to intellectual functioning. *Annual Review of Psychology, 50,* 471-507.

Bandura, A. (1986). *Social foundations of thought and action.* Englewood Cliffs, NJ: Prentice-Hall.

Belle, D. (1991). Gender differences in the social moderators of stress. In A. Monat & R. S. Lazarus (Eds.), *Stress and coping: An anthology* (pp. 258-274). New York: Columbia University Press.

Biesanz, J. C., West, S. G., & Kwok, O.-M. (2003). Personality over time: Methodological approaches to the study of short-term and long-term development and change. *Journal of Personality, 71,* 905-941.

Bleidorn, W., Kandler, C., Riemann, R., Angleitner, A., & Spinath, F. M. (2009). Patterns and source of adult personality development: Growth curve analysis of the NEO-PI-R Scales in a longitudinal twin study. *Journal of Personality and Social Psychology, 97,* 142-155.

Block. J. (1993). Studying personality the long way. In D. C. Funder, R. D. Parke, C. Tomlinson-Keasey, & K. Widaman (Eds.), *Studying lives through time* (pp. 9-41). Washington, DC: American Psychological Association.

Bollen, K. A. (1989). *Structural equations with latent variables.* New York: Wiley.

Borkenau, P., & Ostendorf, F. (1993). *NEO-Fünf-Faktoren Inventar (NEO-FFI) nach Costa und McCrae. Handanweisung.* Göttingen: Hogrefe.

Borland, D. C. (1982). A cohort analysis approach to the empty-nest syndrome among three ethnic groups of women: A theoretical position. *Journal of Marriage and Family, 44,* 117-129.

Bornstein, M. H. (1989). Stability in early mental development: From attention and information processing in infancy to language and cognition in childhood. In M. H. Bornstein & N. A. Krasnegor (Eds.), *Stability and continuity in mental development* (pp. 147-170). Hillsdale, NJ: Erlbaum.

Bouchard, T. J., Jr., & Loehlin, J. C. (2001). Genes, evolution, and personality. *Behavior Genetics, 31,* 243-273.

Bowling, N. A., Beehr, T. A., & Swader, W. M. (2005). Giving and receiving social support at work: The roles of personality and reciprocity. *Journal of Vocational Behavior, 67,* 467-489.

Brim, O. G. (1992). *Ambition: How we manage success and failure throughout our lives.* New York: Basic Books.

Brim, O. G., Ryff, C. D., & Kessler, R. C. (2004). The MIDUS national survey: An overview. In O. G. Brim, C. D. Ryff, & R. C. Kessler (Eds.), *How healthy are we? A national study of well-being at midlife* (pp. 1-36). Chicago: University of Chicago Press.

Bulloch, A., Williams, J., Lavorato, D., & Patten, S. (2009). The relationship between major depression and marital disruption is bidirectional. *Depression and Anxiety, 26,* 1172-1177.

Bundesagentur für Arbeit (2009). *Arbeitslosigkeit im Zeitverlauf.* Nürnberg: Bundesagentur für Arbeit.

Bundesamt für Statistik (2011). *Struktur der Wohnbevölkerung.* Neuchâtel: Bundesamt für Statistik.

Bundesamt für Statistik (2011). *Struktur der ständigen Wohnbevölkerung.* Neuchâtel: Bundesamt für Statistik.

Burnham, T. C. (2007). High-testosterone men reject low ultimatum game offers. *Proceedings of the Royal Society B-Biological Sciences, 274,* 2327-2330.

Buss, D. M. (1995). Psychological sex differences: Origins through sexual selection. *American Psychologist, 50,* 164-168.

Cacioppo, J. T., Petty, R. E., Feinstein, J. A., Blair, W., & Jarvis, G. (1996). Dispositional differences in cognitive motivation: The life and times of individuals varying in need for cognition. *Psychological Bulletin, 119,* 197-253.

Campbell, A. (2008). Attachment, aggression and affiliation: The role of oxytocin in female social behavior. *Biological Psychology, 77,* 1-10.

Cantor, N. (1990). From thought to behavior: "having" and "doing" in the study of personality and cognition. *American Psychologist, 45,* 735-750.

Carstensen, L. L. (1992). Social and emotional patterns in adulthood: Support for socioemotional selectivity theory. *Psychology and Aging, 7,* 331-338.

Carstensen, L. L., & Charles, S. T. (1999). Emotion in the second half of life. *Current Directions in Psychological Science, 7,* 144-149.

Carstensen, L. L., Isaacowitz, D. M., & Charles, S. T. (1999). Taking time seriously: A theory of socioemotional selectivity. *American Psychologist, 54,* 165-181.

Carstensen, L. L., Turan, B., Scheibe, S., Ram, N., Ersner-Hershfield, H., Samanez-Larkin, G. R., et al. (2011). Emotional experience improves with age: Evidence based on over 10 years of experience sampling. *Psychology and Aging, 26,* 21-33.

Casey, B. J., Tottenham, N., Linston, C., & Durston, S. (2005). Imaging the developing brain: What have we learned about cognitive development? *Trends in Cognitive Science, 9,* 104-110.

Caspi, A., & Moffitt, T. E. (1993). When do individual differences matter? A paradoxical theory of personality coherence. *Psychological Inquiry, 4,* 247-271.

Caspi, A., & Roberts, B. W. (2001). Personality change and continuity across the life course. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality theory and research* (Vol. 2, pp. 300-326). New York: Guilford.

Caspi, A., & Roberts, B. W. (2001). Personality development across the life course: The argument for change and continuity. *Psychological Inquiry, 12,* 49-66.

Caspi, A., Roberts, B. W., & Shiner, R. L. (2005). Personality development: Stability and change. *Annual Review of Psychology, 56,* 453-484.

Cattell, R. B. (1943). The description of personality: Basic traits resolved into clusters. *Journal of Abnormal and Social Psychology, 38,* 476-506.

Cattell, R. B. (1987). *Intelligence: Its structure, growth, and action.* Amsterdam: North-Holland.

Ceci, S. J., Williams, W. M., Barnett, S. M. (2009). Women's underrepresentation in science: Sociocultural and biological considerations. *Psychological Bulletin, 135,* 218-261.

Chapman, B. P. (2007). Bandwidth and fidelity on the NEO-Five Factor Inventory: Replicability and reliability of Saucier's (1998) item cluster subcomponents. *Journal of Personality Assessment, 88,* 220-234.

Chapman, B. P., Duberstein, P. R., Sörensen, S., & Lyness, J. M. (2007). Gender differences in Five Factor Model personality traits in an elderly cohort. *Personality and Individual Differences, 43,* 1594-1603.

Charles, S. T., & Carstensen, L. L. (2010). Social and emotional aging. *Annual Review of Psychology, 61*, 383-409.

Charles, S. T., Reynolds, C. A., & Gatz, M. (2001). Age-related differences and change in positive and negative affect over 23 years. *Journal of Personality and Social Psychology, 80*, 136-151.

Charter, R. A., & Larsen, B. S. (1983). Fisher's Z to r. *Educational and Psychological Measurement, 43*, 41-42.

Cherlin, A. J., Chase-Lansdale, P. L., & McRae, C. (1998). Effects of parental divorce on mental health throughout the life course. *American Sociological Review, 63*, 239-249.

Christensen, L., & Mendoza, J. L. (1986). A method of assessing change in a single subject: An alteration of the RC index. *Behavior Therapy, 17*, 305-308.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Cohen, S., Doyle, W. J., Turner, R. B., Alper, C. M., & Skoner, D. P. (2003a). Emotional style and susceptibility to the common cold. *Psychosomatic Medicine, 65*, 652-657.

Cohen, S., Doyle, W. J., Turner, R. B., Alper, C. M., & Skoner, D. P. (2003b). Sociability and susceptibility to the common cold. *Psychological Science, 14*, 389-395.

Cohen-Mansfield, J., Shmotkin, D., & Goldberg, S. (2009). Loneliness in old age: Longitudinal changes and their determinants in an Israeli sample. *International Psychogeriatrics, 21*, 1160-1170.

Collins, W. A., & Steinberg, L. (2006). Adolescent development in interpersonal context. In W. Damon, R. Lerner, & N. Eisenberg (Eds.), *Handbook of child psychology: Vol. 3. Social, emotional, and personality development* (6th ed., pp.1003-1067). New York: Wiley.

Costa, P. T., Jr., Herbst, J. H., McCrae, R. R., & Siegler, I. C. (2000). Personality at midlife: Stability, intrinsic maturation, and response to life events. *Assessment, 7*, 365-378.

Costa, P. T., Jr., & McCrae, R. R. (1985). *The NEO Personality Inventory manual.* Odessa, FL: Psychological Assessment Resources.

Costa, P. T., Jr., & McCrae, R. R. (1988). From catalog to classification: Murray's needs and the Five-Factor Model. *Journal of Personality and Social Psychology, 55*, 258-265.

Costa, P. T., Jr., & McCrae, R. R. (1992). *Professional manual: Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI)*. Odessa, FL: Psychological Assessment Resources.

Costa, P. T., Jr., & McCrae, R. R. (1994). Set like plaster: Evidence for the stability of adult personality. In T. F. Heatherton & J. L. Weinberger (Eds.), *Can personality change?* (pp. 21-40). Washington, DC: American Psychological Association.

Costa, P. T., Jr., & McCrae, R. R. (1995). Domains and facets: Hierarchical personality assessment using the revised NEO personality inventory. *Journal of Personality Assessment, 64,* 21-50.

Costa, P. T., Jr., McCrae, R. R., Zonderman, A. B., Barbano, H. E., Lebowitz, B., & Larson, D. M. (1986). Cross-sectional studies of personality in a national sample: 2. Stability in neuroticism, extraversion, and openness. *Psychology and Aging, 1,* 144-149.

Costa, P. T., Jr., Terracciano, A., & McCrae, R. R. (2001). Gender differences in personality traits across cultures: Robust and surprising findings. *Journal of Personality and Social Psychology, 81,* 322-331.

Costa, P. T., Jr., Zonderman, A. B., McCrae, R. R., Cornoni-Huntley, J., Locke, B. Z., & Barbano, H. E. (1987). Longitudinal analyses of psychological well-being in a national sample: Stability of mean levels. *Journal of Gerontology, 42,* 50-55.

Czeschlik, T., & Nürk, H.-C. (1995). Shyness and sociability: Factor structure in a German sample. *European Journal of Psychological Assessment, 11,* 122-127.

Dannefer, D. (1988). Differential gerontology and the stratified life course: Conceptual and methodological issues. In G. L. Maddox & M P. Lawton (Eds.), *Annual review of gerontology and geriatrics* (Vol. 8, pp. 3-36). New York: Springer.

De Fruyt, F., Bartels, M., Van Leeuwen, K. G., De Clercq, B., Decuyper, M., & Mervielde, I. (2006). Five types of personality continuity in childhood and adolescence. *Journal of Personality and Social Psychology, 91,* 538-552.

De Fruyt, F., Van Leeuwen, K., Bagby, R. M., Rolland, J.-P., & Rouillon, F. (2006). Assessing and interpreting personality change and continuity in patients treated for major depression. *Psychological Assessment, 18,* 71-80.

Dembroski, T. M., MacDougall, J. M., Costa, P. T., Jr., & Grandits, G. A. (1989). Components of hostility as predictors of sudden death and myocardial infarction in the Multiple Risk Factor Intervention Trial. *Psychosomatic Medicine, 51,* 514-522.

Denissen, J. J. A., Neumann, L., & van Zalk, M. H. W. (2010). How the Internet is changing the implementation of traditional research methods, people's daily lives, and the way in which developmental scientists conduct research. *International Journal of Behavioral Development, 34,* 564-575.

Denissen, J. J. A., & Penke, L. (2008a). Motivational individual reaction norms underlying the Five-Factor model of personality: First steps towards a theory-based conceptual framework. *Journal of Research in Personality, 42,* 1285-1302.

Denissen, J. J. A., & Penke, L. (2008b). Neuroticism predicts reactions to cues of social inclusion. *European Journal of Personality, 22,* 497-517.

DeVries, H. M., Kerrick, S., & Oetinger, M. (2007). Satisfaction and regrets of midlife parents: A qualitative analysis. *Journal of Adult Development, 14,* 6-15.

Digman, J. M., & Takemoto-Chock, N. K. (1981). Factors in the natural language of personality: Re-analysis, comparison, and interpretation of six major studies. *Multivariate Behavioral Research, 16,* 149-170.

Dingemanse, N. J., Kazern, A. J. N., Réale, D., & Wright, J. (2010). Behavioural reaction norms: Animal personality meets individual plasticity. *Trends in Ecology and Evolution, 25,* 81-89.

Ditzen, B., Schmidt, S., Strauss, B., Nater, U. M., Ehlert, U., & Heinrichs, M. (2008). Adult attachment and social support interact to reduce psychological but not cortisol responses to stress. *Journal of Psychosomatic Research, 64,* 479-486.

Donnellan, M. B., Conger, R. D., & Burzette, R. G. (2007). Personality development from late adolescent to young adulthood: Differential stability, normative maturity, and evidence for the maturity-stability hypothesis. *Journal of Personality, 75,* 237-264.

Donnellan, M. B., & Lucas, R. E. (2008). Age differences in the Big Five across the life span: Evidence from two national samples. *Psychology and Aging, 23,* 558-566.

Donnellan, M. B., & Robins, R. W. (2010). The development of personality across the lifespan. In G. Matthews & P. Corr (Eds.), *Cambridge handbook of personality psychology* (pp. 191-204). Cambridge: Cambridge University Press.

D'Onofrio, B. M., Turkheimer, E., Emery, R. E., Slutske, W. S., Heath, A. C., Madden, P. A., et al. (2005). A genetically informed study of marital instability and its association with offspring psychopathology. *Journal of Abnormal Psychology, 114,* 570-586.

Downey, G., Bonica, C., & Rincon, C. (1999). Rejection sensitivity and adolescent romantic relationships. In W. Furman, B. Bradford Brown, & C. Feiring (Eds.), *The development of romantic relationships in adolescence* (pp. 148-174). London: Cambridge University Press.

Eccles, J. S., Midgley, C., Wigfield, A., Buchanan, C. M., Reuman, D., Flanagan, C., et al. (1993). Development during adolescence. The impact of stage-environment fit on young adolescents' experiences in schools and in families. *American Psychologist, 48,* 90-101.

Elder, G. H. (1969). Occupational mobility, life patterns, and personality. *Journal of Health and Social Behavior, 10,* 308-323.

Erikson, E. H. (1950). *Childhood and society.* New York: Norton.

Erikson, E. H. (1959). Identity and the life cycle. *Psychological Issues Monograph 1.* New York: International University Press.

Estabrook, R., Salthouse, T. A., & Nesselroade, J. R. (2009). Higher order invariance and age comparisons in depression, neuroticism, and anxiety. *Multivariate Behavioral Research, 44,* 850-851.

Eurostat Yearbook (2010). *Europe in figures.* Luxembourg: Publications Office of the European Union.

Feingold, A. (1994). Gender differences in personality: A meta-analysis. *Psychological Bulletin, 116,* 429-456.

Feldman, R. S. (2009). *Development across the life span (5th ed.).* Upper Saddle River, NJ: Pearson.

Filipp, S.-H. (1990). *Kritische Lebensereignisse.* München: Psychologie-Verlags-Union.

Filipp, S.-H. (1992). Could it be worse? The diagnosis of cancer as a prototype of traumatic life events. In L. Montada, S.-H. Filipp, & M. J. Lerner (Eds.), *Life crises and experiences of loss in adulthood* (pp. 23-56). Hillsdale, NJ: Erlbaum.

Filipp, S.-H. (2007). Kritische Lebensereignisse [Critical life events]. In J. Brandstädter & U. Lindenberger (Eds.), *Entwicklungspsychologie der Lebensspanne* (pp. 337-366). Stuttgart: Kohlhammer.

Filipp, S.-H., & Aymanns, P. (2009). *Kritische Lebensereignisse und Lebenskrisen. Vom Umgang mit den Schattenseiten des Lebens* [Critical life events and life crises. Coping with the dark sides of life]. Stuttgart: Kohlhammer.

Fraley, R. C., Waller, N. G., & Brennan, K. A. (2000). An item response theory analysis of self-report measures of adult attachment. *Journal of Personality and Social Psychology, 78,* 350-365.

Gadalla, T. M. (2009). Impact of marital dissolution on men's and women's incomes: A longitudinal study. *Journal of Divorce and Remarriage, 50,* 55-65.

Garavan, H., Hester, R., Murphy, K., Fassbender, C., & Kelly, C. (2006). Individual differences in the functional neuroanatomy of inhibitory control. *Brain Research, 1105,* 130-142.

Giorgio, A., Watkins, K. E., Chadwick, M., James, S., Winmill, L., Douaud, G., et al. (2010). Longitudinal changes in grey and white matter during adolescence. *Neuroimage, 49,* 94-103.

Glenn, N. D. (1980). Values, attitudes, and beliefs. In O. G. Brim, Jr. & J. Kagan (Eds.), *Constancy and change in human development* (pp. 596-640). Cambridge, MA: Harvard University Press.

Goldberg, L. R. (1981). Language and individual differences: The search for universals in personality lexicons. In L. Wheeler (Ed.), *Review of personality and social psychology,* (Vol. 2, pp. 141-165). Beverly Hills, CA: Sage.

Goldberg, L. R. (1990). An alternative "description of personality": The Big-Five factor structure. *Journal of Personality and Social Psychology, 59,* 1216-1229.

Goldberg, L. R. (1992). The development of markers for the Big-Five factor structure. *Psychological Assessment, 4,* 26-42.

Gosling, S. D., Vazire, S., Srivatava, S., & John, O. P. (2004). Should we trust web-based studies? A comparative analysis of six preconceptions about internet questionnaires. *American Psychologist, 59,* 93-104.

Harman, H. H. (1976). *Modern factor analysis.* Chicago: University of Chicago Press.

Hartup, W. W., & Stevens, N. (1997). Friendships and adaptations in the life course. *Psychological Bulletin, 121,* 355-370.

Havighurst, R. J. (1981). *Developmental tasks and education* (3rd ed.). New York: Longman.

Heckhausen, J., Wrosch, C., & Schulz, R. (2010). A motivational theory of life-span development. *Psychological Review, 117,* 32-60.

Helson, R., Jones, C., & Kwan, V. S. Y. (2002). Personality change over 40 years of adulthood: Hierarchical linear modeling analyses of two longitudinal samples. *Journal of Personality and Social Psychology, 83,* 752-766.

Helson, R., & Moane, G. (1987). Personality change in women from college to midlife. *Journal of Personality and Social Psychology, 36,* 287-186.

Helson, R., & Srivastava, S. (2001) Three paths of adult development: Conservers, seekers, and achievers. *Journal of Personality and Social Psychology, 80,* 995-1010.

Helson, R., & Wink, P. (1987). Two conceptions of maturity examined in the findings of a longitudinal study. *Journal of Personality and Social Psychology, 53,* 531-541.

Hertzog, C., & Nesselroade, J. R. (2003). Assessing psychological change in adulthood: An overview of methodological issues. *Psychology and Aging, 18,* 639-657.

Hetherington, E., M., & Kelly, J. (2002). *For better or for worse: Divorce reconsidered.* New York: Norton.

Hilton, J. M., & Anderson, T. L. (2009). Characteristics of women with children who divorce in midlife compared to those who remain married. *Journal of Divorce and Remarriage, 50,* 309-329.

Hofer, S. M., & Sliwinski, M. J. (2001). Understanding aging. *Gerontology, 47,* 341-352.

Hogan, R. & Roberts, B. W. (2004). A socioanalytic model of maturity. *Journal of Career Assessment, 12,* 207-217.

Hooker, K. (2002). New directions for research in personality and aging: A comprehensive model for linking levels, structures, and processes. *Journal of Research in Personality, 36,* 318-334.

Hooker, K., & McAdams, D. P. (2003). Personality reconsidered: A new agenda for aging research. *Journal of Gerontology: Psychological Sciences, 58B,* 296-304.

Horn, J. L. (1988). Thinking about human abilities. In J. R. Nesselroade & R. B. Cattell (Eds.), *Handbook of multivariate experimental psychology* (2nd ed., pp. 645-685). New York: Plenum.

Ingles, C. J., La Greca, A. M., Marzo, J. C., Garcia-Lopez, L. J., & Garcia-Fernandez, J. M. (2010). Social Anxiety Scale for adolescents: Factorial invariance and latent mean differences across gender and age in Spanish adolescents. *Journal of Anxiety Disorders, 24,* 847-855.

Insel, T. R. (2010). The challenge of translation in social neuroscience: A review of oxytocin, vasopressin, and affiliative behavior. *Neuron, 65,* 768-779.

Jacobson, N. S., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology, 59,* 12-19.

Jang, K. L., Livesley, W. J., & Vernon, P. A. (1998). A twin study of genetic and environmental contributions to gender differences in traits delineating personality disorder. *European Journal of Personality, 12,* 331-344.

John, O. P. (1990). The "Big Five" factor taxonomy: Dimensions of personality in the natural language and in questionnaires. In L. A. Pervin (Ed.), *Handbook of personality: Theory and research* (pp. 66-100). New York: Guilford Press.

John, O. P., Donahue, E. M., & Kentle, R. L. (1991). *The Big Five Inventory-Versions 4a and 54.* Berkeley: University of California, Berkeley, Institute of Personality and Social Research.

John, O. P., & Gross, J. J. (2004). Healthy and unhealthy emotion regulation: Personality processes, individual differences, and life span development. *Journal of Personality, 72,* 1301-1334.

John, O. P., Hampson, S. E., & Goldberg, L. R. (1991). The basic level in personality-trait hierarchies: Studies of trait use and accessibility in different contexts. *Journal of Personality and Social Psychology, 60,* 348-361.

John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm shift to the integrative Big Five trait taxonomy: history, measurement, and conceptual issues. In O. P. John & R. W. Robins (Eds.), *Handbook of personality: Theory and research* (3th ed., pp. 114-158). New York: Guilford.

John, O. P., & Srivastava, S. (1999). The Big-Five Trait Taxonomy: History, measurement, and theoretical perspectives. In L. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed.). New York: Guilford.

Johnson, W., McGue, M., & Krueger, R. F. (2005). Personality stability in late adulthood: A behavioral genetic analysis. *Journal of Personality, 73,* 523-552.

Johnson, D. R., & Wu, J. (2002). An empirical test of crisis, social selection, and role explanations of the relationship between marital disruption and psychological distress: A pooled time-series analysis of four-wave panel data. *Journal of Marriage and Family, 64,* 211-224.

Johnson, J. A. (1997). Units of analysis for the description and explanation of personality. In R. Hogan, J. A. Johnson, & S. Briggs (Eds.), *Handbook of personality psychology* (pp. 73-93). San Diego, CA: Elsevier.

Kalmijn, M. (2005). The effects of divorce on men's employment and social security histories. *European Journal of Population, 21,* 347-366.

Kanfer, R., & Ackerman, P. L. (2004). Aging, adult development and work motivation. *Academy of Management Review, 29,* 440-458.

Karp (1987). Professionals beyond midlife: Some observations on work satisfaction in the fifty- to sixty-year decade. *Journal of Aging Studies, 1,* 209-223.

Kercher, A. J., Rapee, R. M., & Schniering, C. A. (2009). Neuroticism, life events and negative thoughts in the development of depression in adolescent girls. *Journal of Abnormal Child Psychology, 37,* 903-915.

Kim, J. E., & Moen, P. (2001). Moving into retirement: Preparation and transitions in late midlife. In M. E. Lachman (Ed.), *Handbook of midlife development* (pp. 487-527). New York: Wiley.

King, L. A., Hicks, J. A., Krull, J. L., & Del Gaiso, A. K. (2006). Positive affect and the experience of meaning in life. *Journal of Personality and Social Psychology, 90,* 179-196.

Kirsch, P., Esslinger, C., Chen, Q., Mier, D., Lis, S., Siddhanti, S., et al. (2005). Oxytocin modulates neural circuitry for social cognition and fear in humans. *Journal of Neuroscience, 25,* 11489-11493.

Klimstra, T. A., Hale, W. W., III, Raaijmakers, Q. A. W., Branje, S. J. T., & Meeus, W. H. J. (2009). Maturation of personality in adolescence. *Journal of Personality and Social Psychology, 96,* 898-912.

Kosfeld, M., Heinrichs, M., Zak, P. J., Fischbacher, U., & Fehr, E. (2005). Oxytocin increases trust in humans. *Nature, 435,* 673-676.

Labouvie-Vief, G. M., & Blanchard-Fields, F. (1982). Cognitive aging and psychological growth. *Ageing and Society, 2,* 183-209.

Lachman, M. E. (2004). Development in midlife. *Annual Review of Psychology, 55,* 305-331.

Lachman, M. E., & Weaver, S. L. (1997). The Midlife Development Inventory (MIDI) personality scales: Scale construction and scoring. Technical report. http://www.brandeis.edu/projects/lifespan/MIDI-Personality-Scales.pdf

Lang, F. R., Lüdtke, O., & Asendorpf, J. B. (2001). Testgüte und psychometrische Äquivalenz der deutschen Version des Big Five Inventory (BFI) bei jungen, mittelalten und alten Erwachsenen [Validity and psychometric equivalence of the German version of the Big Five Inventory in young, middle-aged and old adults]. *Diagnostica, 47,* 111-121.

Lehmann, R., Allemand, M., Zimprich, D., & Martin, M. (2010) Persönlichkeitsentwicklung im mittleren Erwachsenenalter [Personality development in middle adulthood]. *Zeitschrift für Entwicklungspsychologie und Pädagogische Psychologie, 42,* 79-89.

Lehmann, R., Allemand, M., Leist, A., & Hill, P. (2010). *Divorce predicts interindividual differences in personality trait development in middle adulthood.* Manuscript submitted for publication.

Lehmann, R., Denissen, J. J. A., Allemand, M., & Penke, L. (2010). *Age and gender differences in motivational manifestations of the Big Five from age 16 to 60*. Manuscript submitted for publication.

Lewis, M. (1999). On the development of personality. In L. A. Pervin & O. P. John (Eds.), *Handbook of Personality: Theory and Research* (2nd ed., pp. 327-346). New York: Guilford Press.

Lippa, R. A. (2007). The preferred traits of mates in a cross-national study of heterosexual and homosexual men and women: Examination of biological and cultural influences. *Archives of Sexual Behavior, 36,* 193-208.

Löckenhoff, C. E., Terracciano, A., Bienvenu, O. J., Patriciu, N. S., Nestadt, G., McCrae, R. R., et al. (2008). Ethnicity, education, and the temporal stability of personality traits in the East Baltimore Epidemiologic Catchment Area study. *Journal of Research in Personality, 42,* 577-598.

Löckenhoff, C. E., Terracciano, A., & Costa, P. T., Jr. (2009). Five-factor model personality traits and the retirement transition: Longitudinal and cross-sectional associations. *Psychology and Aging, 24,* 722-728.

Lodi-Smith, J., & Roberts, B. W. (2007). Social investment and personality: A meta-analysis of the relationship of personality traits to investment in work, family, religion, and volunteerism. *Personality and Social Psychology Review, 11,* 68-86.

Lucas, R. E. (2007). Adaptation and the set-point model of subjective well-being: Does happiness change after major life events? *Current Directions in Psychological Science, 16,* 75-80.

Lucas, R. E., & Donnellan, M. B. (2009). Age differences in personality: Evidence from a nationally representative Australian sample. *Developmental Psychology, 45,* 1353-1363.

Lucas, R. E., & Donnellan, M. B. (in press). Personality development across the life span: Longitudinal analyses with a national sample from Germany. *Journal of Personality and Social Psychology.*

Lüdtke, O., Trautwein, U., & Husemann, N. (2009). Goal and personality trait development in a transitional period: Assessing change and stability in personality development. *Personality and Social Psychology Bulletin, 35,* 428-441.

Luhmann, M., & Eid, M. (2009). Does it really feel the same? Changes in life satisfaction following repeated life events. *Journal of Personality and Social Psychology, 97,* 363-381.

Luna, B., Thulborn, K. R., Munoz, D. P., Merriam, E. P., Garver, K. E., Minshew, N. J., et al. (2001). Maturation of widely distributed brain function subserves cognitive development. *Neuroimage, 13,* 786-793.

Luszczynska, A., Diel, M., Gutiérrez-Doña, B., Kuusinen, P., & Schwarzer, R. (2004). Measuring one component of dispositional self-regulation: Attention control in goal pursuit. *Personality and Individual Differences, 37,* 555-566.

Maccoby, E. E. (1990). Gender and relationships: A developmental account. *American Psychologist, 45,* 513–520.

MacEwen, K. E., Barling, J., Kelloway, E. K., & Higginbottom, S. F. (1995). Predicting retirement anxiety: The roles of parental socialization and personal planning. *Journal of Social Psychology, 135,* 203-213.

Maiden, R. J., Peterson, S. A., Caya, M., & Hayslip, B., Jr. (2003). Personality changes in the old-old: A longitudinal study. *Journal of Adult Development, 10,* 31-39.

Martin, M., Grünendahl, M., & Martin, P. (2001). Age differences in stress, social resources, and well-being in middle and older age. *Journal of Gerontology, Series B: Psychological Sciences, 56,* 214-222.

Martin, M., & Kliegel, M. (2008). Psychologische Grundlagen der Gerontologie (2. Aufl.). In C. Tesch-Römer, H.-W. Wahl, S. Weyerer, & S. Zank (Reihenhrsg.), *Grundriss Gerontologie: Band 3.* Stuttgart: Kohlhammer.

Martin, M., & Mroczek, D. K. (in press). Are personality traits across the lifespan sensitive to environmental demands? *Journal of Adult Development.*

Martin, M., & Zimprich, D. (2005). Cognitive development in midlife. In S. L. Willis & M. Martin (Eds.), *Middle adulthood: A lifespan perspective* (pp. 179-206). Thousand Oaks, CA: Sage.

Martin, P., Long, M. V., & Poon, L. W. (2002). Age changes and differences in personality traits and states of the old and very old. *Journal of Gerontology: Psychological Sciences, 57B,* 114-152.

Martin, P., & Martin, M. (2000). Desing und Methodik der Interdisziplinären Längsschnittstudie des Erwachsenenalters. In P. Martin, K. U. Ettrich, U. Lehr, D. Roether, M. Martin, & A. Fischer-Cyrulies (Eds.), *Aspekte der Entwicklung im mittleren und höheren Lebensalter*. Darmstadt: Steinkopff.

Martin, P., Poon, L. W., Kim, E., & Johnson, M. A. (1996). Social and psychological resources of the oldest old. *Experimental Aging Research, 22,* 121-139.

Mastekaasa, A. (1992). Marriage and psychological well-being: Some evidence on selection into marriage. *Journal of Marriage and the Family, 54,* 901-911.

Mazur, E. (1989). Predicting gender differences in same-sex friendships from affiliation motive and value. *Psychology of Women Quarterly, 13,* 277-291.

McAdams, D. P. (1992). The Five-Factor Model in personality: A critical appraisal. *Journal of Personality, 60,* 329-361.

McAdams, D. P. (2001). Generativity in midlife. In M. E. Lachman (Ed.), *Handbook of midlife development* (pp. 395-443). New York: Wiley.

McAdams, D. P., & Adler, J. M. (2006). How does personality develop? In D. Mroczek and T. Little (Eds.), *The handbook of personality development* (pp. 469-492). Mahwah, NJ: Lawrence Erlbaum.

McAdams, D. P., & Olson, B. D. (2010). Personality development: Continuity and change over the life course. *Annual Review of Psychology, 61,* 517-542.

McArdle, J. J., & Nesselroade, J. R. (1994). Using multivariate data to structure developmental change. In H. W. Reese & S. H. Cohen (Eds.), *Lifespan developmental psychology: Methodological contributions* (pp. 223-267). Hillsdale, NJ: Erlbaum.

McCrae, R. R., & Costa, P. T., Jr. (1996). Toward a new generation of personality theories: Theoretical contexts for the five-factor model. In J. W. Wiggins (Ed.), *The five-factor model of personality: Theoretical perspectives* (pp. 51-87). New York: Guilford Press.

McCrae, R. R., & Costa, P. T., Jr. (1997). Conceptions and correlates of openness to experience. In R. Hogan, J. Johnson, & S. Briggs (Eds.), *Handbook of personality psychology* (pp. 825-847). San Diego, CA: Academic.

McCrae, R. R., & Costa, P. T., Jr. (1999). A five-factor theory of personality. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (pp. 139-153). New York: Guilford.

McCrae, R. R., & Costa, P. T., Jr. (2005). *Personality in adulthood: A five-factor theory perspective* (2nd ed.) New York: Guilford.

McCrae, R. R., & Costa, P. T., Jr. (2008). The Five-Factor theory of personality. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (3th, pp. 159-181). New York: Guilford.

McCrae, R. R., Costa, P. T., Jr., de Lima, M. P., Simões, A., Ostendorf, F., Angleitner, A., et al. (1999). Age differences in personality across the adult life span: Parallels in five cultures. *Developmental Psychology, 35,* 466-477.

McCrae, R. R., Costa, P. T., Jr., Ostendorf, F., Angleitner, A., Hřebíčková, M., Avia, M. D., et al. (2000). Nature over nurture: Temperament, personality, and life span development. *Journal of Personality and Social Psychology, 78,* 173-186.

McCrae, R. R., Costa, P. T., Jr., Terracciano, A., Parker, W. D., Mills, C. J., De Fruyt, F., et al. (2002). Personality trait development from age 12 to age 18: Longitudinal, cross-sectional, and cross-cultural analyses. *Journal of Personality and Social Psychology, 83,* 1456-1468.

McCrae, R. R., & John, O. P. (1992). An introduction to the five-factor model and its applications. *Journal of Personality, 60,* 175-215.

McCrae, R. R., Terracciano, A., & 78 Members of the Personality Profiles of Cultures Project (2005). Universal features of personality traits from the observer's perspective: Data from 50 cultures. *Journal of Personality and Social Psychology, 88,* 547-561.

McCrae, R. R., Yamagata, S., Jang, K. L., Riemann, R., Ando, J., Ono, Y., et al. (2008). Substance and artifact in the higher-order factors of the Big Five. *Journal of Personality and Social Psychology, 95,* 442-455.

Meredith, W., & Horn, J. L. (2001). The role of factorial invariance in modeling growth and change. In L. M. Collins & A. G. Sayer (Eds.), *New methods for the analysis of change* (pp. 203-240). Washington, DC: American Psychological Association.

Miller, G. E., Cohen, S., Rabin, B. S., Skoner, D. P., & Doyle, W. J. (1999). Personality and tonic cardiovascular, neuroendocrine, and immune parameters. *Brain, Behavior, and Immunity, 13,* 109-123.

Mitchell, B. A., Lovegreen, L. D. (2009). The empty nest syndrome in midlife families: A multimethod exploration of parental gender differences and cultural dynamics. *Journal of Family Issues, 30,* 1651-1670.

Moen, P., & Wethington, E. (1999). Midlife development in a life course context. In S. L. Willis & J. D. Reid (Eds.), *Life in the middle: Psychological and social development in middle age* (pp. 3-24). San Diego, CA: Academic Press.

Molenaar, P. C. M. (2004). A manifesto on psychology as idiographic science: Bringing the person back into scientific psychology, this time forever. *Measurement: Interdisciplinary Research and Perspectives, 2,* 201-218.

Morse, C. K. (1993). Does variability increase with age? An archival study on cognitive measures. *Psychology and Aging, 8,* 146-154.

Mroczek, D. K., & Little, T. D. (2006). *Handbook of personality development*. Mahwah, NJ: Lawrence Erlbaum Associates.

Mroczek, D. K., & Spiro, A., III. (2003). Modeling intraindividual change in personality traits: Findings from the normative aging study. *Journal of Gerontology: Psychological Sciences, 58,* 153-165.

Mroczek, D. K., & Spiro, A., III. (2007). Personality change influences mortality in older men. *Psychological Science, 18,* 371-376.

Mroczek, D. K., Spiro, A., III., & Griffin, P. W. (2006). Personality and aging. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (6th ed., pp. 363-377). New York: Academic Press.

Murphy, K. R., & Davidshofer, C. O. (2001). *Psychological testing: Principles and applications* (5th ed.). Upper Saddle River, NJ: Prentice-Hall.

National Center for Health Statistics (n.d.). *National marriage and divorce rate trends.* Retrieved October 22, 2010, from http://www.cdc.gov/nchs/nvss/marriage_divorce_tables.htm.

Nelson, A. E., & Dannefer, D. (1992). Aged heterogeneity: Fact or fiction? The fate of diversity in gerontological research. *The Gerontologist, 32,* 17-23.

Nesselroade, J. R. (1970). Application of multivariate strategies to problems of measuring and structuring long-term change. In L. R. Goulet & P. B. Baltes (Eds.), *Life-span developmental psychology: Research and theory* (p. 193-211). New York: Academic Press.

Nesselroade, J. R. (1991). Interindividual differences in intraindividual change. In L. M. Collins & J. L. Horn (Eds.), *Best methods for the analysis of change* (pp. 92-105). Washington, DC: American Psychological Association.

Nesselroade, J. R., & Estabrook, R. (2008). Factor invariance, measurement, and studying development over the lifespan. In H. Bosworth & C. Hertzog (Eds.), *Aging and Cognition: Research Methodologies and Empirical Advances (pp. 39-52).* Washington, D.C.: American Psychological Association.

Nesselroade, J. R., Gersdorf, D., Hardy, S. A., & Ram, N. (2007). Idiographic filters for psychological constructs. *Measurement: Interdisciplinary Research and Perspective, 5,* 217-235.

Nettle, D., & Penke, L. (2010). Personality: Bridging the literatures from human psychology and behavioural ecology. *Philosophical Transactions of the Royal Society B, 365,* 4043-4050.

Netz, Y., Zach, S., Dennerstein, L., & Guthrie, J. R., (2005). The menopausal transition: Does it induce women's worries about aging? *Climacteric, 8,* 333-341.

Neyer, F. J., & Lehnart, J. (2007). Relationships matter in personality development: Evidence from an 8-year longitudinal study across young adulthood. *Journal of Personality, 75,* 535-568.

Noftle, E. E., & Fleeson, W. (2010). Age differences in Big Five behavior averages and variabilities across the adult life span: Moving beyond retrospective, global summary accounts of personality. *Psychology and Aging, 25,* 95-107.

Ostendorf, F. (1990). *Sprache und Persönlichkeitsstruktur: Zur Validität des Fünf-Faktoren-Modells der Persönlichkeit.* Regensburg: Roderer.

Park, D. C., Lautenschlager, G., Hedden, T., Davidson, N. S., Smith, A. D., & Smith, P. K. (2002). Models of visuospatial and verbal memory across the adult lifespan. *Psychology and Aging, 17,* 299-320.

Paus, T. (2005). Mapping brain maturation and cognitive development during adolescence. *Trends in Cognitive Sciences, 9,* 60-68.

Penke, L. (2010). Bridging the gap between modern evolutionary psychology and the study of individual differences. In D. M. Buss & P. H. Hawley (Eds.), *The evolution of personality and individual differences.* New York: Oxford University Press.

Penke, L., Denissen, J. J. A., & Miller, G. F. (2007a). The evolutionary genetics of personality. *European Journal of Personality, 21*, 549-587.

Penke, L., Denissen, J. J. A, & Miller, G. F. (2007b). Evolution, genes, and inter-disciplinary personality research. *European Journal of Personality, 21,* 639-665.

Perrig-Chiello, P., & Höpflinger, F. (2001). *Zwischen den Generationen. Frauen und Männer im mittleren Lebensalter.* Zürich: Seismo-Verlag.

Peugh, J. L. (2010). A practical guide to multilevel modeling. *Journal of School Psychology, 48,* 85-112.

Piaget, J. (1983). Piaget's theory. In P. H. Mussen (Ed.), *Handbook of child psychology: Vol. 1, History, theory, and methods* (pp. 103-128). New York: Wiley.

Pressman, S. D., & Cohen, S. (2005). Does positive affect influence health? *Psychological Bulletin, 131,* 925-971.

Prinzie, P., & Dekovic, M. (2008). Continuity and change of childhood personality characteristics through the lens of teachers. *Personality and Individual Differences, 45,* 82-88.

Pulkkinen, L., & Kokko, K. (2000). Identity development in adulthood: A longitudinal study. *Journal of Research in Personality, 34,* 445-470.

Putney, N. M., & Bengtson, V. L. (2001). Families, intergenerational relationships, and kinkeeping in midlife. In M. E. Lachman (Ed.), *Handbook of midlife development* (pp. 528-570). New York: Wiley.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Thousand Oaks, CA: Sage.

Raudenbush, S. W., Bryk, A., & Congdon, R. (2005). *Hierarchical linear and nonlinear modeling (HLM)* (Version 6.08) [Statistical software]. Lincolnwood, IL: Scientific Software International.

Riediger, M., Freund, A. M., & Baltes, P. B. (2005). Managing life through personal goals: Intergoal facilitation and intensity of goal pursuit in younger and older adulthood. *Journal of Gerontology: Psychological Sciences, 60B,* P84-91.

Roberts, B. W. (1997). Plaster or plasticity: Are adult work experiences associated with personality change in women? *Journal of Personality, 65,* 205-231.

Roberts, B. W. (2007). Contextualizing personality psychology. *Journal of Personality, 75,* 1071-1082.

Roberts, B. W., & Bogg, T. (2004). A longitudinal study of the relationships between conscientiousness and the social-environmental factors and substance-use behaviors that influence health. *Journal of Personality, 72,* 325-354.

Roberts, B. W., Caspi, A., & Moffitt, T. E. (2001). The kids are alright: Growth and stability in personality development from adolescence to adulthood. *Journal of Personality and Social Psychology, 81,* 670-683.

Roberts, B. W., & DelVecchio, W. F. (2000). The rank-order consistency of personality traits from childhood to old age: A quantitative review of longitudinal studies. *Psychological Bulletin, 126,* 3-25.

Roberts, B. W., Helson, R., & Klohnen, E. C. (2002). Personality development and growth in women across 30 years: Three perspectives. *Journal of Personality, 70,* 79-102.

Roberts, B. W., & Mroczek, D. K. (2008). Personality trait change in adulthood. *Current Directions in Psychological Science, 17,* 31-35.

Roberts, B. W., & Pomerantz, E. M. (2004). On traits, situations, and their integration: A developmental perspective. *Personality and Social Psychology Review, 8,* 402-416.

Roberts, B. W., Robins, R. W., Trzesniewski, K. H., & Caspi, A. (2003). Personality trait development in adulthood. In J. T. Mortimer & M. Shanahan (Eds.), *Handbook of the life course* (pp. 579-595). New York: Plenum.

Roberts, B. W., Walton, K., Bogg, T., & Caspi, A. (2006). De-investment in work and non-normative personality trait change in young adulthood. *European Journal of Personality, 20,* 461-474.

Roberts, B. W., Walton, K. E., & Viechtbauer, W. (2006). Patterns of mean-level change in personality traits across the life course: A meta-analysis of longitudinal studies. *Psychological Bulletin, 132,* 1-25.

Roberts, B. W., & Wood, D. (2006). Personality development in the context of the neo-socioanalytic model of personality. In D. K. Mroczek & T. D. Little (Eds.), *Handbook of personality development* (pp. 11-39). Mahwah, NJ: Lawrence Erlbaum.

Roberts, B. W., Wood, D., & Caspi, A. (2008). The development of personality traits in adulthood. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (3th ed., pp. 375-398). New York: Guilford.

Roberts, B. W., Wood, D., & Smith, J. L. (2005). Evaluating Five Factor Theory and social investment perspectives on personality trait development. *Journal of Research in Personality, 39,* 166-184.

Robins, R. W., Caspi, A., & Moffitt, T. E. (2002). It's not just who you're with, it's who you are: Personality and relationship experiences across multiple relationships. *Journal of Personality, 70,* 925-964.

Robins, R. W., Fraley, R. C., Roberts, B. W., & Trzesniewski, K. H. (2001). A longitudinal study of personality change in young adulthood. *Journal of Personality, 69,* 617-640.

Robins, R. W., Trzesniewski, K. H., Tracy, J. L., Gosling, S. D., & Potter, J. (2002). Global self-esteem across the lifespan. *Psychology and Aging, 17,* 423-434.

Roepke, S., McAdams, L. A., Lindamer, L. A., Patterson, T. L., & Jeste, D. V. (2001). Personality profiles among normal ages individuals as measured by the NEO-PI-R. *Aging and Mental Health, 5,* 159-164.

Rogers, G. M., Park, J.-H., Essex, M. J., Klein, M. H., Silva, S. G., Hoyle, R. H., et al. (2010). The dysfunctional attitudes scale: Psychometric properties in depressed adolescents. *Journal of Clinical Child & Adolescent Psychology, 38,* 781-789.

Rosnow, R. L., & Rosenthal, R. (2005). *Beginning behavioral research: A conceptual primer* (5th ed.). Englewood Cliffs, NJ: Pearson/Prentice Hall.

Rossi, A. S. (2004). The menopausal transition and aging processes. In O. G. Brim, C. D. Ryff & R. C. Kessler (Eds.), *How healthy are we? A national study of well-being at midlife* (pp. 153-201). Chicago: University of Chicago Press.

Rubia, K., Smith, A. B., Woolley, J., Nosarti, C., Heyman, I., Taylor, E., et al. (2006). Progressive increase of frontostriatal brain activation from childhood to adulthood during event-related tasks of cognitive control. *Human Brain Mapping, 27,* 973-993.

Sassler, S. (2010). Partnering across the life course: Sex, relationships, and mate selection. *Journal of Marriage and Family, 72,* 557-575.

Saucier, G. (1998). Replicable item-cluster subcomponents in the NEO five-factor inventory. *Journal of Personality Assessment, 70,* 263-276.

Savla, J., Almeida, D. M., Davey, A., & Zarit, S. H. (2008). Routine assistance to parents: Effects on daily mood and other stressors. *Journal of Gerontology: Social Sciences, 63B,* 154-161.

Sbarra, D., & Nietert, P. (2009). Divorce and death: Forty years of the Charleston Heart Study. *Psychological Science, 20,* 107-113.

Schmithorst, V. J., Wilke, M., Dardzinski, B. J., & Holland, S. K. (2005). Cognitive functions correlate with white matter architecture in a normal pediatric population: A diffusion tensor MRI study. *Human Brain Mapping, 26,* 139-147.

Schmitt, D. P. (2004). The Big Five related to risky sexual behavior across 10 world regions: Differential personality associations of sexual promiscuity and relationship infidelity. *European Journal of Personality, 18,* 301-319.

Schmitt, D. P., Realo, A., Voracek, M., & Allik, J. (2008). Why can't a man be more like a woman? Sex differences in Big Five personality traits across 55 cultures. *Journal of Personality and Social Psychology, 94,* 168-182.

Scollon, C. N., & Diener, E. (2006). Love, work, and changes in extraversion and neuroticism over time. *Journal of Personality and Social Psychology, 91,* 1152-1165.

Simon, R. W. (2002). Revisiting the relationship among gender, marital status, and mental health. *American Journal of Sociology, 107,* 1056-96.

Simpson, P. A., Greller, M. M., & Stroh, L. K. (2002). Variations in human capital investment activity by age. *Journal of Vocational Behavior, 61,* 109-138.

Singer, J. D., & Willett, J. B. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence.* New York: Oxford University Press.

Small, B. J., Hertzog, C., Hultsch, D. F., & Dixon, R. A. (2003). Stability and change in adult personality over 6 years: Findings from the Victoria Longitudinal Study. *Journal of Gerontology: Psychological Sciences, 58B,* 166-176.

Smith, E., & Grawe, K. (2005). Which therapeutic mechanisms work when? A step towards the formulation of empirically validated guidelines for therapists' session-to-session decisions. *Clinical Psychology and Psychotherapy, 12,* 112-123.

Smith, J., & Baltes, P. B. (1999). Trends and profiles of psychological functioning in very old age. In P. B. Baltes & K. U. Mayer (Eds.), *The Berlin Aging Study: Aging from 70 to 100* (pp. 197-226). New York: Cambridge University Press.

Solnick, S. (2001). Gender differences in the ultimatum game. *Economic Inquiry, 39*, 189-200.

Soto, C. J., John, O. P., Gosling, S. D., & Potter, J. (2011). Age differences in personality traits from 10 to 65: Big Five domains and facets in a large cross-sectional sample. *Journal of Personality and Social Psychology, 100,* 330-348.

Spelke, E. S., & Grace, A. D. (2006). Abilities, motives, and personal styles. *American Psychologist, 61,* 725-726.

Spiro, A., III, Aldwin, C. M., Levenson, M. R., & Bossé, R. (1990). Longitudinal finding from the Normative Aging Study: II. Do emotionality and extraversion predict symptom change? *Journal of Gerontology: Psychological Sciences, 45,* P136-P144.

Srivastava, S., John, O. P., Gosling, S. D., & Potter, J. (2003). Development of personality in early and middle adulthood: Set like plaster or persistent change? *Journal of Personality and Social Psychology, 84,* 1041-1053.

Statistisches Bundesamt (2009). *Wirtschaftsrechnungen. Private Haushalte in der Informationsgesellschaft – Nutzung von Informations- und Kommunikationstechnologien.* Wiesbaden: Statistisches Bundesamt.

Staudinger, U. M., & Bluck, S. (2001). A view on midlife development from life-span theory. In M. E. Lachman (Ed.), *Handbook of midlife development* (pp. 3-39). New York: Wiley.

Staudinger, U. M., & Kunzmann, U. (2005). Positive adult personality development: Adjustment and/ or growth? *European Psychologist, 10,* 320-329.

Steiger, J. H. (1980). Tests for comparing elements of a correlation matrix. *Psychological Bulletin, 87,* 245-251.

Steinberg, L. (2005). Cognitive and affective development in adolescence. *Trends in Cognitive Sciences, 9,* 69-74.

Steinberg, L. (2007). Risk taking in adolescence: New perspectives from brain and behavioral science. *Current Directions in Psychological Science, 16,* 55-59.

Steinberg, L., & Monahan, K. C. (2007). Age differences in resistance to peer influence. *Developmental Psychology, 43,* 1531-1543.

Steinberg, L., & Silverberg, S. B. (1986). The vicissitudes of autonomy in early adolescence. *Child Development, 57,* 841-851.

Sterns, H. L., & Huyck, M. H. (2001). The role of work in midlife. In M. E. Lachman (Ed.), *Handbook of midlife development* (pp. 447-486). New York: Wiley.

Steyer, R., Schmitt, M., & Eid, M. (1999). Latent state-trait theory and research in personality and individual differences. *European Journal of Personality, 13,* 389-408.

Stewart, A. J., Ostrove, J. M., & Helson, R. (2001). Middle aging in women: Patterns of personality change from the 30s to the 50s. *Journal of Adult Development, 8,* 23-37.

Strohschein. L., McDonough, P., Monette, G., & Shao, Q. (2005). Marital transitions and mental health: Are there gender differences in the short-term effects of marital status change? *Social Science and Medicine, 61,* 2293-2303.

Sturaro, C., Denissen, J. J. A., Van Aken, M. A. G., & Asendorpf, J. B. (2008). Person-environment transactions during emerging adulthood: The interplay between personality characteristics and social relationships. *European Psychologist, 13,* 1-11.

Sutin, A. R., Costa, P. T., Jr., Wethington, E., & Eaton, W. (2010). Turning points and lessons learned: Stressful life events and personality trait development across middle adulthood. *Psychology and Aging, 25,* 524-533.

Szolnoki, A., Perc, M., Szabo, G., & Stark, H.-U. (2009). Impact of aging on the evolution of cooperation in the spatial prisoner's dilemma game. *Physical Review, E80,* 021901.

Tamnes, C. K., Ostby, Y., Fjell, A. M., Westlye, L. T., Due-Tonnessen, P.,& Walhovd, K. B. (2010). Brain maturation in adolescence and young adulthood: Regional age-related changes in cortical thickness and white matter volume and microstructure. *Cerebral Cortex, 20,* 534-548.

Tau, G. Z., & Peterson, B. S. (2010). Normal development of brain circuits. *Neuropsychopharmacology, 35,* 147-168.

Taylor, S. E., Klein, L. C., Lewis, B. P., Gruenewald, T. L., Gurung, R. A. R., & Updegraff, J. A. (2000). Biobehavioral responses to stress in females: Tend-and-befriend, not fight-or-flight. *Psychological Review, 107,* 411-429.

Taylor-Carter, M. A., Cook, K., & Weinberg, C. (1997). Planning and expectations of the retirement experience. *Educational Gerontology, 23,* 273-288.

Terracciano, A., Costa, P. T., Jr., & McCrae, R. R. (2006). Personality plasticity after age 30. *Personality and Social Psychology Bulletin, 32,* 999-1009.

Terracciano, A., McCrae, R. R., Brant, L. J., & Costa, P. T., Jr. (2005). Hierarchical linear modeling analysis of the NEO-PI-R scales in the Baltimore Longitudinal Study of Aging. *Psychology and Aging, 3,* 493-506.

Troisi, A. (2001). Gender differences in vulnerability to social stress – A Darwinian perspective. *Physiology and Behavior, 73,* 443-449.

Tucker, J. S., & Anders, S. L. (2001). Social control of health behaviors in marriage. *Journal of Applied Social Psychology, 31,* 467-485.

Tucker, L. R. (1951). A method for synthesis of factor analytic studies. *Personnel research section report no. 984.* Washington, DC: Department of the Army.

Tucker-Drob, E. M., & Salthouse, T. A. (2008). Adult age trends in the relations among cognitive abilities. *Psychology and Aging, 23,* 453-460.

Tupes, E. C., & Christal, R. E. (1961). *Recurrent personality factors based on trait ratings* (USAF ASD Tech. Rep. No. 61-97). Lackland Air Force Base, TX: U.S. Air Force.

Van Aken, M. A. G., Denissen, J. J. A., Branje, S. J. T., Dubas, J. S., & Goossens, L. (2006). Midlife concerns and short-term personality change in middle adulthood. *European Journal of Personality, 20,* 497-513.

Vita, A. J., Terry, R. B., Hubert, H. B., & Fries, J. F. (1998). Aging, health risks, and cumulative disability. *New England Journal of Medicine, 338,* 1035-1041.

Wade, T., & Pevalin, D. (2004). Marital transitions and mental health. *Journal of Health and Social Behavior, 45*, 155-170.

Wahl, H.-W., & Kruse, A. (2005). Historical perspectives of middle age within the life span. In S. L. Willis & M. Martin (Eds.), *Middle adulthood: A lifespan perspective* (pp. 3-34). Thousand Oaks, CA: Sage.

Waite, L. J., Luo, Y., & Lewin, A. C. (2009). Marital happiness and marital stability: Consequences for psychological well-being. *Social Science Research, 38,* 201-212.

Wang, H., & Amato, P. R. (2000). Predictors of divorce adjustment: Stressors, resources, and definitions. *Journal of Marriage and Family, 62,* 655-668.

Watson, D. (2004). Stability versus change, dependability versus error: Issues in the assessment of personality over time. *Journal of Research in Personality, 38,* 319-350.

Watson, D., & Humrichouse, J. (2006). Personality development in emerging adulthood: Integrating evidence from self-ratings and spouse ratings. *Journal of Personality and Social Psychology, 91,* 959-974.

Weiss, A., Costa, P. T., Jr., Karuza, J., Duberstein, P. R., Friedman, B., & McCrae, R. R. (2005). Cross-sectional age differences in personality among medicare patients aged 65 to 100. *Psychology and Aging, 20,* 182-185.

Whitbourne, S. K. (2001). The physical aging process in midlife: Interactions with psychological and sociocultural factors. In M. E. Lachman (Ed.), *Handbook of midlife development* (pp. 109-155). New York: Wiley.

Williams, K. (2003). Has the future of marriage arrived? A contemporary examination of gender, marriage, and psychological well-being. *Journal of Health and Social Behavior, 44*, 470-487.

Winter, D. G., John, O. P., Stewart, A. J., Kohnen, E. C., & Duncan, L. E. (1998). Traits and motives: Toward an integration of two traditions in personality research. *Psychological Review, 105,* 230-250.

Wischniewski, J., Windmann, S., Juckel, G., & Brüne, M. (2009). Rules of social exchange: Game theory, individual differences and psychopathology. *Neuroscience and Biobehavioral Reviews, 33,* 305-313.

Wong, M. M., & Csikszentmihalyi, M. (1991). Affiliation motivation and daily experience: Some issues on gender differences. *Journal of Personality and Social Psychology, 60,* 154-164.

Zelinski, E. M., Gilewski, M. J., & Schaie, K. W. (1993). Individual differences in cross-sectional and three-year longitudinal memory performance across the adult lifespan. *Psychology and Aging, 8,* 176-186.

Curriculum Vitae

Education

2008 – 2011	University of Zurich, Department of Psychology, Gerontopsychology, Doctoral Candidate
2002 – 2008	University of Bern, Department of Psychology, licentiate (lic. phil.) in Clinical Psychology and Development Disorders. Minor: Psychopathology

Employment

Since 2008	University of Zurich, Department of Psychology, Research Assistant

Graduate School

Since 2008	Fellow of the International Max Planck Research School *The Life Course: Evolutionary and Ontogenetic Dynamics (LIFE)*